though very reluctantly, to remove it from *Buxbaumia* as a genus, and consequently to a different part of the order in an artificial system.

1. *D. foliosum.* (Tab. VIII.)

D. foliosum. *Mohr Obs. Bot. p.* 34. *Hook. in Fl. Lond. with a figure. Moug. et Nestl. n.* 37. Buxbaumia foliosa. *Linn. Syst. Veg. p.* 945. *Hedw.—Engl. Bot. t.* 329. *Turn. Musc. Hib. p.* 104. Buxbaumia sessilis. *Schmid.*—Phascum montanum. *Huds.*—P. maximum. *Lightf.*—*Dill. Musc. t.* 32. *f.* 13.

Hab. In woods and on rocks in alpine situations.

The stems are exceedingly short, and grow in densely-matted patches. The leaves small, ligulate, of a dark green colour, furnished with a strong nerve. The perichætial leaves large, erect, membranous, pale brown, covering entirely the capsule, lanceolato-oblong, acuminated, and towards the extremity cut in a singular manner into long slender segments at the margin; nerve strong, rigid, brown, very excurrent, serrulate at the extremity. Capsule large, ovate, gibbous, oblique. Calyptra mitriform. Lid conical, acuminated. Peristome simple, consisting of a plicate membrane forming a cone.

## 8. TETRAPHIS.

Gen. Char. *Fruitstalks* terminal; *Peristome* single, consisting of four equidistant upright teeth; *Calyptra* mitriform. (Tab. I.)

The lid in the only two known species of this genus is remarkably thin and scariose in texture, and the teeth are reticulated, not striated as in most mosses. The calyptra is striated, or furrowed; the leaves are rigid.

1. *T. pellucida*; stems elongated, leaves ovato-acuminate, those of the perichætium lanceolate; capsule cylindrical. (Tab. VIII.)

T. pellucida. *Hedw. Sp. Musc. t.* 7. *f.* 1. *Engl. Bot. t.* 1020. *Turn. Musc. Hib. p.* 12. *Moug. et Nestl. n.* 14. Mnium pellucidum. *Linn.*—*Dill. Musc. t.* 31. *f.* 2.

Hab. Generally found on decaying trunks of trees; sometimes on the ground, and most abundant in mountainous countries.

This plant has a peculiar character which distinguishes it from every other known moss. The leaves are of a pale and pleasant green colour, rigid, furnished with a nerve which terminates below the point; those surrounding the perichætium are much longer and narrower than the rest. Capsule oblong, cylindrical: teeth large, brown: calyptra much resembling that of an *Orthotrichum*, but smooth. Besides the plants which bear the male and female fructification (usually so called) there are others which are terminated by cup-shaped receptacles, consisting of broadly obcordate leaves, in the centre of which are fixed by a short footstalk small spherical bodies, bearing an exact analogy to the anthers of *Jungermanniæ*.

2. *T. ovata*; stems very short; leaves few, linear, slightly incrassated upwards, those of the perichætium ovate, obtuse; capsule ovate. (Tab. VIII.)

T. ovata. *Hoppe in Deutschl. Fl.* (with a figure.) *Schwaegr. Suppl. t.* 13. Bryum Brownianum. *Dicks. Crypt. fasc.* 4. *t.* 10. *f.* 16. Orthotrichum Brownianum. *Smith Fl. Brit.*—Grimmia Browniana. *Engl. Bot. t.* 1422.

Hab. Rocks, particularly of granite, in the north of England and Ireland.

Although possessing the true generic character of a *Tetraphis*, the general aspect of the plant and the form and structure of the leaves are totally different. In size, the whole plant rarely exceeds half an inch. Stems scarcely any. Outer leaves very few, half as long as the fruitstalk, linear or only a little swollen upwards, thick, rigid, dotted. Inner or perichætial leaves broad, ovate, concave, rigid, with a faint nerve at the base. All of them of an olive-green colour inclining to brown. Capsule ovate, reticulated, dark brown. Lid conico-acuminate, a little oblique. Hoppe, we believe, first discovered this plant, and described it as a *Tetraphis*: but he has omitted to figure the outer leaves, as has Schwaegrichen; nor has Bridel described them. Sir James Smith, misled by the appearance of the calyptra, placed it among the *Orthotricha* and afterwards with the *Grimmiæ*, and in *English Botany* is a most incorrect figure of the peristome with 8 double teeth, or 16 placed closely in pairs

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# *Muscologia Britannica;*

CONTAINING

# THE MOSSES

OF

## Great Britain & Ireland,

SYSTEMATICALLY ARRANGED AND DESCRIBED;

WITH PLATES ILLUSTRATIVE OF THE CHARACTERS OF THE GENERA AND SPECIES.

---

BY

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1818.

TO

THE REV. JAMES DALTON, M.A.

RECTOR OF CROFT IN YORKSHIRE,

ETC.

THE FOLLOWING SHEETS ARE OFFERED

AS A TESTIMONY OF

THE MOST AFFECTIONATE REGARD

AND ESTEEM,

BY

W. J. HOOKER

AND

THOMAS TAYLOR.

# INTRODUCTION.

To render the Mosses of England generally known, to give to other naturalists an opportunity of profiting by those researches upon which we have ourselves bestowed much time and patience; to fix, if possible, this department of our botany upon a firmer basis; and, by rendering more easy the investigation of one of the most beautiful parts of the creation, to place in a clearer light the wonders of the Divine hand,—such are the motives that we set before us in the undertaking of this work, and such the objects which we flatter ourselves we shall be found in some measure to have attained. At the same time, however, that we trust we may be allowed to indulge in this hope, we are sensible that it can only be entertained in a very imperfect degree. Much may notwithstanding still be done, though all cannot be accomplished; and to us the very study requisite for the doing of it is in itself a pleasure that repays the toil.

To turn more immediately to the object before us, the Muscologia is a subject comparatively new, scarcely thirty years having elapsed since the publication of Hedwig's Theory; a work which first diffused over the science that light by whose aid all future progress has been made in its advancement. The successive labours of this eminent naturalist contributed to build a system

upon firm and philosophic grounds. He has been ably seconded by more recent authors, especially Swartz and Mohr, and his own pupil Schwaegrichen; but perhaps by none so effectually as Bridel, whose work upon the mosses, though full of errors as to species and synonyms, contains a history of the science, and a review of whatsoever is connected with it, at once admirable and unrivalled. To him therefore we refer our readers for information on this head, the nature of our undertaking precluding us from touching upon it as we could wish, and our intention in this preface being little more than briefly to state what may be expected in our work.

No country perhaps of similar extent is more favourable to the growth of mosses than the British isles, where there is so great a variety of soil, and no inconsiderable difference in the climate between the plains and the summits of our highest hills. Our woods, morasses, rocks, and shaded banks afford nourishment to a variety of species, and our mountains, though of small elevation when compared to the Alps of Switzerland and Savoy, yet on account of their northern latitude, and of their rising nearly to the limits of perpetual snow, produce most of the mosses of those highly-favoured regions. In so few parts of Europe has the Muscology of the country been fully investigated, that we cannot fairly draw a comparison between this department of the Flora of any district and our own. In France, including the vast extent of the Alps and Pyrennées, M. De Candolle has enumerated 227 species. Germany, according to Mohr, possesses above 280; and Lapland, by Wahlenberg's statement, 160 species. We estimate our number at less than 260. But it must be remembered that all these authors, not even excepting

Mohr, who has so greatly reduced the number of species made by other botanists, describe as distinct individuals many plants which we look upon only as varieties. France boasts of *Anictangium lapponicum*, *Grimmia plagiopodia*, *Trichostomum pallidum*, *Timmia megapolitana* and *austriaca*, *Neckera cladorhizans* and *pennata*, which we have not. Germany, also, of *Anict. aquaticum*, *Trich. pallidum*, and the two species of *Timmia*; of *Cinclidium stygium*, *Dicranum ambiguum*, *cylindricum*, *Schraderi*, *tortile*, *Didymodon glaucescens* and *latifolium*, *Grimmia trifaria*, *Splachnum urceolatum* and *Hypnum Halleri*. Lapland has *Splachnum rubrum*, *luteum* and *urceolatum*, *Didymodon latifolium* and *pusillum*, *Dicr. cylindricum*, *Schraderi*, *Polytrichum capillare* and *lævigatum*, *Mnium turgidum*, *Cinclidium stygium*, *Timmia austriaca*, *Bryum squarrosum*, *Hypnum sarmentosum*, and *Fontinalis falcata*, which our Flora is not possessed of.

We have peculiar to our islands *Andræa nivalis*, *Gymnostomum Griffithianum*, *viridissimum* and *Donnianum*, *Tortula agraria*, *Grimmia Daviesii*, *Weissia Templetoni*, *Didymodon flexifolium*, *Orthotrichum Hutchinsiæ*, *pulchellum* and *Lyelli*, *Daltonia splachnoides*, *Bartramia arcuata*, *Hookeria læte-virens*, *Zygodon conoideum*, and some others of less interest.

In a work like the present it will not be expected that we should enter much upon the subject of the structure of the Mosses, or their modes of increase, and what have been considered by most authors as the organs of fructification. Indeed it is our opinion that too little is at present known on these heads to enable us to speak satisfactorily; and we are hoping to gather much new information on the subject from our very intelligent

friend Mr. Drummond, of the Cork Botanic Garden, who is prosecuting his researches with uncommon assiduity. We have adopted for the most part Hedwig's terminology; but we have in general declined noticing the male flowers, as they are generally called, not only because we think their office or use is but imperfectly known, but because they are with so much difficulty to be discovered.

We shall say a few words on the Genera of Mosses, which, since the time of Linnæus, who established only six, have been varying as the species have been multiplied, and as the time and attention of botanists have been more closely directed to them. Hedwig increased the number of Genera to thirty-three, including the exotic kinds. From them we have removed those whose characters depend solely on the situation of the male flowers, and have founded our characters, in the first place, upon the absence or presence of the fringe of the *Peristome*, which Hedwig employed to so much advantage, and, following him, Turner and Smith; 2dly, its simple or double nature; 3dly, its configuration and direction; 4thly, upon the lateral or terminal situation of the fruitstalk; and, 5thly and lastly, upon the form of the calyptra, whether dimidiate or entire (mitriform), a character we think of great importance, to which Mr. Turner has long had recourse, but which was first publicly brought into use by that eminent German Cryptogamist Mohr. By means of this we see many families formed which are so in natural habit. Thus is Hedwig's *Anictangium* kept separate from *Gymnostomum*, *Grimmia* from *Weissia*, *Trichostomum* from *Didymodon*, *Zygodon* from *Orthotrichum*, and *Hookeria* from *Hypnum*. We think likewise that scarcely a less de-

gree of importance is to be given to the lateral and terminal situation of the fruitstalk; by the aid of which natural groups (and these last should never be lost sight of, although in the present imperfect state of the science they must occasionally yield to more precise artificial characters,) are often found. Thus we presume *Anictangium* (the foreign *A. aquaticum*) may be kept from *Hedwigia*, *Pterogonium* from *Weissia*, *Leucodon* from *Dicranum*, *Fabronia*, an exotic genus, from *Orthotrichum*, and above all *Hypnum* from *Bryum*.

Still it must be acknowledged, that even on these principles, which may at first sight appear so clear, it will be difficult to assign characters to some genera which seem gradually to pass into each other. It is, for example, hard to pronounce if *Gymnostomum microstomum*, *G. fasciculare*, and *G. Griffithianum* really possess what should be considered a peristome. It bears the closest resemblance to that membranous ring which in an early state we see on the mouth of the capsule of *Weissia affinis* and *W. trichodes*; but in these two species it breaks into teeth in a more advanced state. The peristome of *Orthotrichum* presents remarkable anomalies; sometimes the teeth are in a single row, and only of one kind, as in *O. anomalum*; in *O. striatum* the peristome is clearly double, the narrower teeth or cilia arising from an internal membrane; whereas in most of the other species which have ciliary processes they originate on the side of the larger teeth. In *Dicranum* the teeth are subject to vary, and to border on the one hand upon *Trichostomum*, and on the other upon *Grimmia*, in which genus we find the teeth sometimes split. In *Leskea* it is difficult sometimes to see the inner membrane rising above the mouth of the cap-

sule, and then the peristome precisely agrees with that of *Neckera*, to which perhaps the genus ought to be united. In those mosses which make yearly shoots, these sometimes arise so near the point of insertion of the fructification as to make the fruitstalk appear lateral, which is especially the case in the genus *Bartramia*. —Even the calyptra of some mosses seems to be intermediate, having so slight a fissure, that we are doubtful which we should call that of *Cinclidotus* and of *Splachnum*:—sometimes in *Trichostomum*, besides the short fissure at the base, we see in *Tr. microcarpon* a single longitudinal cleft reaching three-fourths of the way up, making it appear a truly dimidiate calyptra. Such too is the case with the *Tr. funale* of Schwaegrichen, which gave him occasion to say of it "Calyptræ forma ab affinibus *Trichostomis* etiam recedit et rursus, calyptram ad definitiones genericas adhibendam non esse, demonstrat." In this, and indeed in all the previously mentioned cases, the question is to be decided by the habit of the plant which thus has its share of influence in the formation of Genera.

As to what regards the species, although very constant in their minute characters, they, as well as other plants, vary according to exposure, soil, humidity, elevation at which they grow, and a variety of other circumstances. It is not therefore surprising that these varieties should be raised to the rank of species by those who have not had it in their power to devote the time and attention necessary to the observing them abroad in their various places of growth, and in the closet to microscopical researches. Frequent leisure, various journeys made purposely through various parts of our happy islands, and especially in the more alpine parts of Scotland and Ire-

land, added to a continued use of the microscope at home in the examining of our own collections, and references to the descriptions of others, have, we hope, in many instances enabled us to detect errors in preceding authors, to separate species from varieties, and to discover marks and characters indicative of species in what had been before undecided, or only considered as variations of known individuals. On the form of the leaf undoubtedly much stress is to be laid; but in the serratures, and particularly in the absence or presence, the length, the breadth, and various conformation of the nerves, so much insisted on by Mohr, characters will frequently be found when they fail in almost every other part of the plant.

But it is not solely on our own investigations that we wish to rely for many of the facts brought forward in these sheets. Many friends both at home and abroad have kindly contributed to us specimens and remarks which have been of great use to us. As however these have been in every instance recorded under the species which by their means have been illustrated, we shall here content ourselves with acknowledging the various liberal communications of Dr. Swartz among foreign botanists, and among those of our country of Mr. Dawson Turner, whose valuable Herbarium has been freely offered to our use, and whose various communications and corrections have stamped a value on our book which it could not otherwise have possessed.

Since our main object in the following pages has been to assist the student of Muscology in the investigation of the species of these isles, we have given in the body of the work such generic and specific characters and remarks upon each as we think necessary for their discri-

mination, without entering into such details as to swell our book to an inconvenient size, or to make it tedious by long and dry descriptions. To these we have added figures drawn by ourselves with the utmost care, and engraved by an artist* of high talents under our immediate inspection, of every species, when necessary, of the natural size and magnified. In some of the larger tribes, such as the *Hypna* and a few others, whose characters are founded principally on their foliage, the leaves only have been generally represented magnified, otherwise the price of the book must have been considerably enhanced by the additional number of plates. The English language has been preferred for this work, because we know many naturalists who pursue the study of this pleasing branch of natural history with the most unwearied industry, who are nevertheless in a situation of life which has precluded them from acquiring the knowledge of any but their native tongue:—yet we have not been unmindful of foreign botanists, should we be so fortunate as to have our book fall into their hands; and with this chiefly in view we have given a Synoptical Table both of the Genera and Species in Latin. This method is founded upon that of Lamarck and De Candolle, with some alterations, which we trust will be found useful, and such as has been already adopted in the Monograph of the British Jungermanniæ.

Should these Tabulæ not be clearly understood at first sight, a few remarks will, we hope, render them perfectly intelligible to our readers. The principle consists

* Mr. W. H. C. Edwards of Bungay, in Suffolk, whose accuracy in botanical engraving has been displayed in many of the plates of Roxburgh's *Plants of the Coast of Coromandel*, and in all those of Hooker's *British Jungermanniæ*.

in presenting, in succession, pairs of opposite characters, between which the student is to choose, by a comparison with the plant, till the required genus or species be found. Suppose, for example, that he takes *Polytrichum piliferum* as the object of his examination. On having recourse to the TABULA GENERUM, he will see by examining the mouth of the capsule that it will not accord with the first, but with the second character there given, "*Peristomio instructo*," which carries him to No. 7, where he will again compare his plant with the other character, and will be referred to No. 8. Here he will have no difficulty in discovering whether the peristome be single or double, and will consequently be carried on to No. 9, where he will with equal facility decide upon that character which allows more than four teeth to the peristome; and on being referred to No. 10, the second line leads his eye to No. 11, where the words "dentibus apicibus connexis" are applicable only to the plant in question; and then going on to No. 12, the character against POLYTRICHUM will be found to be the only one which will suit his plant.—On referring to the species under the genus *Polytrichum* in the continuation of the Tabula, it will be seen that, having a calyptra covered with hair-like processes, it will belong to that character which refers to No. 3, when an examination of the leaves will be necessary to decide upon what we are to choose. These leaves having their margins involute, we go to No. 4, where, finding our plant to have diaphanous points to the leaves, we cannot hesitate in naming it *P. piliferum*. The same plan must be adopted in the determination of any other species. With regard to our Synonyms, we have endeavoured to get them into as small a space as was possible, consist-

ently with utility; and our great aim has been to quote those authors who have given the first name to the species, and those who have given the first good figure of it.

We have referred with much pleasure to a valuable work published at Strasburgh, consisting of dried specimens of cryptogamic plants, and entitled *Stirpes Cryptogamæ Vogeso-Rhenanæ, auctoribus Mougeot et Nestler.* We regret that the work is so little known in this country; but we trust that this loss will be in some measure compensated by a similar one of the Musci and Hepaticæ of our own country, which will be published by Mr. Hobson of Manchester, to whom the Muscology of this country is much indebted. It will readily be seen how much superior these works must be in point of accuracy to the best of plates, and they have also the advantage of being vended to the public at a much cheaper rate.

# MUSCORUM BRITANNICORUM GENERUM CLAVIS ANALYTICA.

1. { Peristomio nullo. 2.
   { Peristomio instructo. 7.

(*Peristomio nullo.*)

2. { Capsula quadrivalvi . . . ANDRÆA. I.*
   { Capsula integra. 3.

3. { Capsula sessili, receptaculo pedicellato SPHAGNUM. II.
   { Capsula pedicellata, receptaculo sessili. 4.

4. { Operculo adnato . . . . PHASCUM. III.
   { Operculo deciduo. 5.

5. { Operculo demum laciniato . SCHISTOSTEGA. IV.
   { Operculo integro. 6.

6. { Calyptra campanulata . . ANICTANGIUM. V.
   { Calyptra dimidiata . . GYMNOSTOMUM. VI.

(*Peristomio instructo.*)

7. { Peristomio simplice. 8.
   { Peristomio duplice. 22.

* *Peristomio simplice.*

8. { Peristomio e membrana conoidea, plicata DIPHYSCIUM. VII.
   { Peristomio e dentibus vel ciliis constante. 9.

9. { Dentibus quatuor . . . TETRAPHIS. VIII.
   { Dentibus plusquam quatuor. 10.

10. { Dentibus octo-geminatis . . SPLACHNUM. IX.
    { Dentibus 16 vel pluribus. 11.

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* The figures at the end of the Generic names refer to the genus at the head of its species in the succeeding part of the Table.

11. Dentibus apicibus connexis. 12.
Dentibus apicibus liberis. 13.

12. Dentibus 16, apicibus cohærentibus CONOSTOMUM. X.
Dentibus 32, apicibus membrana horizontali connexis POLYTRICHUM. XI.

13. Dentibus spiraliter tortis. 14.
Dentibus rectis. 15.

14. Dentibus basi per trabes connexis (fructu immerso) CINCLIDOTUS. XII.
Dentibus liberis vel basi membrana connexis TORTULA. XIII.

15. Dentibus 16, integris. 16.
Dentibus 16, divisis, vel triginta duobus. 19.

16. Calyptra campanulata, vel mitriformi. 17.
Calyptra dimidiata. 18.

17. Calyptra lævi, capsulam omnino tegente ENCALYPTA. XIV.
Calyptra sulcata, capsula breviore . GRIMMIA. XV.

18. Fructu laterali . . . PTEROGONIUM. XVI.
Fructu terminali . . . WEISSIA. XVII.

19. Dentibus 16, bifidis . . DICRANUM. XVIII.
Dentibus 16, vel 32 per paria approximatis vel basi solummodo per paria connexis. 20.

20. Calyptra mitriformi . . TRICHOSTOMUM. XIX.
Calyptra dimidiata. 21.

21. Fructu laterali . . . LEUCODON. XX.
Fructu terminali . . . DIDYMODON. XXI.

** *Peristomio duplice.*

22. Peristomio interno e ciliis liberis. 23.
Peristomio interno membranaceo, vel e ciliis plus minusve connexis. 28.

23. Fructu terminali. 24.
Fructu laterali. 26.

24. Peristomii dentibus obliquis, ciliis his oppositis FUNARIA. XXII.
Peristomii dentibus rectis, ciliis his alternantibus. 25.

25. Calyptra dimidiata . . ZYGODON. XXIII.
Calyptra mitriformi . ORTHOTRICHUM. XXIV.

26. Ciliis e membrano interno . NECKERA. XXV.
Ciliis e dentium lateribus. 27.

27. Calyptra dimidiata . . ANOMODON. XXVI.
Calyptra mitriformi . . DALTONIA. XXVII.

28. Peristomio interno conico-membranaceo vel cancellato. 29.
Peristomio interno membranaceo-laciniato. 30.

29. Peristomio interno cancellato (fructu laterali) FONTINALIS. XXVIII.
Peristomio interno membranaceo, plicato BUXBAUMIA. XXIX.

30. Peristomii interni laciniis 16, æqualibus, bifidis (capsula globosa) . . . BARTRAMIA. XXX.
Peristomii interni laciniis 16 vel pluribus, integris, vel perforatis. 31.

31. Calyptra mitriformi . . HOOKERIA. XXXI.
Calyptra dimidiata. 32.

32. Fructu laterali . . . HYPNUM. XXXII.
Fructu terminali . . . BRYUM. XXXIII.

## SPECIERUM CLAVIS ANALYTICA.

### I. ANDRÆA.

1. Foliis enervibus. 2.
Foliis nervo instructis. 3.

2. Foliis oblongo-spatulatis, acuminatis, erectis *A. alpina.*
Foliis ovato-lanceolatis, obtusis, falcato-secundis *A. rupestris.*

3. Foliis lanceolato-subulatis, falcato-secundis, perichætialibus oblongis, enervibus . . *A. Rothii.*
Foliis lanceolatis, subfalcatis, secundis, perichætialibus conformibus . . . *A. nivalis.*

## II. SPHAGNUM.

1. Foliis ovatis. 2.
   Foliis lanceolatis. 3.

2. Foliis obtusis . . . . *S. obtusifolium.*
   Foliis acuminatis, squarroso-recurvis *S. squarrosum.*

3. Foliis lanceolatis, confertis . . *S. acutifolium.*
   Foliis lanceolato-subulatis, laxis . *S. cuspidatum.*

## III. PHASCUM.

1. Surculis reptantibus, aphyllis, ramosis, articulatis *P. serratum.*
   Surculis reptantibus nullis. 2.

2. Folii magis minusve subulatis. 3.
   Foliis magis minusve ovatis. 6.

(*Foliis subulatis.*)

3. Foliis perichætialibus demum lateralibus, caulinorum dissimilibus . . . . *P. alternifolium.*
   Foliis perichætialibus terminalibus, caulinorum similibus. 4.

4. Foliis siccitate crispis . . . *P. crispum.*
   Foliis semper strictis. 5.

5. Foliis subulato-setaceis, nervo excurrente *P. subulatum.*
   Foliis lanceolato-subulatis, nervo evanescente (fructu demum laterali) . . . *P. axillare.*

(*Foliis ovatis.*)

6. Foliorum nervo evanescente . . *P. patens.*
   Foliorum nervo excurrente. 7.

7. Foliis seta brevioribus. 8.
   Foliis seta longioribus. 10.

8. Capsula elliptica . . . . *P. bryoides.*
   Capsula fere globosa. 9.

9. Foliis ovato-acuminatis, setam subæquantibus *P. curvicollum.*
   Foliis ovatis, seta multo brevioribus . *P. rectum.*

10. Foliis late ovatis, acuminatis, conniventibus *P. muticum.*
    Foliis ovato-acuminatis, erectis . *P. cuspidatum.*

## IV. SCHISTOSTEGA.

*S. pennata.*

## V. ANICTANGIUM.

1. Foliorum apicibus diaphanis . . *A. ciliatum.*
   Foliorum apicibus coloratis . . *A. imberbe.*

## VI. GYMNOSTOMUM.

1. Foliis perichætialibus reliquorum dissimilibus. 2.
   Foliis perichætialibus reliquorum similibus. 3.

(*Foliis perichætialibus instructis.*)

2. Foliis lineari-lanceolatis, capsulis striatis *G. lapponicum.*
   Foliis lanceolatis, capsulis lævibus . *G. æstivum.*

(*Foliis perichætialibus nullis.*)

3. Caule elongato, ramoso. 4.
   Caule simplice. 5.

* *Caule elongato, ramoso.*

4. Foliis late lanceolatis . . *G. viridissimum.*
   Foliis subulatis . . . *G. curvirostrum.*

** *Caule brevi.*

5. Foliis apice latioribus, obtusissimis *G. Griffithianum.*
   Foliis magis minusve acuminatis vel piliferis. 6.

6. Foliis ovatis lanceolatisve.
   Foliis subulatis. 12.

† *Foliis ovatis lanceolatisve.*

7. Foliis obtusis, piliferis . . . *G. ovatum.*
   Foliis acutis vel acuminatis. 8.

8. Operculo rostrato. 9.
   Operculo perbrevi. 10.

9. Foliis ovatis, integerrimis . . *G. truncatulum.*
   Foliis lanceolatis, serrulatis . . *G Hearnii.*

10. Capsulis ovatis, foliis integerrimis . *G. conicum.*
    Capsulis pyriformibus, foliis serratis (reticulatis). 11.

11. Foliis lanceolatis, acuminatis, marginatis, planis *Gymnostomum fasciculare.*
Foliis ovatis, subacuminatis, immarginatis, concavis *G. pyriforme.*

†† *Foliis subulatis.*

12. Foliis obtusis . . . . . *G. tenue.*
Foliis acutis. 13.

13. Foliis subulatis, capsula turbinata . *G. Donnianum.*
Foliis lanceolato-subulatis, capsula elliptica *G. microstomum.*

## VII. DIPHYSCIUM.

*D. foliosum.*

## VIII. TETRAPHIS.

1. Foliis ovato-lanceolatis, perichætialibus subsimilibus *T. pellucida.*
Foliis linearibus, perichætialibus ovatis . *T. ovata.*

## IX. SPLACHNUM.

1. Foliis acuminatis. 2.
Foliis obtusis. 6.

(*Foliis acuminatis.*)

2. Foliis breviter acuminatis. 3.
Foliis longe acuminatis. 4.

3. Apophysi capsula ampliore . . *S. sphæricum.*
Apophysi capsula angustiore . . . *S. tenue.*

4. Foliis integerrimis . . . . *S. mnioides.*
Foliis serratis.

5. Foliis valde concavis, apophysi capsula latitudine subæquali . . . . . *S. angustatum.*
Foliis planis, apophysi capsula multo ampliore *S. ampullaceum.*

(*Foliis obtusis.*)

6. Foliis rhombeo-rotundatis, apophysi capsula multo ampliore . . . . . *S. vasculosum.*
Foliis ovatis, obtusissimis, apophysi capsula angustiore *S. Frœlichianum.*

## X. CONOSTOMUM.

*C. boreale.*

## XI. POLYTRICHUM.

1. Calyptra calva. 2.
   Calyptra pilosa. 3.

(*Calyptra calva.*)

2. Foliis oblongis, planis, denticulatis . *P. undulatum.*
   Foliis ovatis, concavis (rigidis) integerrimis *P. hercynicum.*

(*Calyptra pilosa.*)

3. Foliis integerrimis, marginibus involutis. 4.
   Foliis denticulatis, marginibus planis. 6.

* *Foliorum marginibus involutis.*

4. Foliorum apicibus diaphanis . . *P. piliferum.*
   Foliorum apicibus coloratis. 5.

5. Foliis acuminatis, margine medium versus involutis *P. juniperinum.*
   Foliis obtusis, margine ad apicem involutis *P. septentrionale.*

** *Foliorum marginibus planis.*

6. Capsula acute quadrangulari, apophysi valde distincta *P. commune.*
   Capsula magis minusve ovata, vel globosa, apophysi fere obsoleta. 7.

7. Foliis lanceolato-subulatis, capsula ovata *P. alpinum.*
   Foliis lanceolatis, capsula cylindracea vel globosa. 8.

8. Caule elongato-ramoso, foliis valde acutis *P. urnigerum.*
   Caule brevi simplice, foliis obtusis. 9.

9. Capsula cylindracea . . . . *P. aloides.*
   Capsula globosa . . . . *P. nanum.*

## XII. CINCLIDOTUS.

*C. fontinaloides.*

## XIII. TORTULA.

1. Foliis rigidis, margine insigniter involuto . *T. rigida.*
   Foliis flexilibus, margine minime involuto. 2.
2. Foliis pilo cano terminatis. 3.
   Foliis epilosis. 4.
3. Peristomii laciniis ad basin usque liberis *T. muralis.*
   Peristomii laciniis inferne in tubum membranaceum unitis . . . . . *T. ruralis.*
4. Peristomii laciniis inferne in tubum longum membranaceum unitis . . . . *T. subulata.*
   Peristomii laciniis liberis. 5.
5. Foliis ovatis (caule perbrevi). 6.
   Foliis lanceolatis, subulatisve (caule elongato). 7.
6. Foliis obovatis, capsula lævi . *T. cuneifolia.*
   Foliis ovatis, capsula striata . . *T. agraria.*
7. Foliis canaliculatis, margine undulatis, siccitate insigniter crispatis . . . . . *T. tortuosa.*
   Foliis plus minusve carinatis vel planis, margine reflexis, siccitate vix crispatis. 8.
8. Foliis acuminatis. 9.
   Foliis obtusiusculis, vel apiculatis. 10.
9. Foliis margine reflexis, perichætialibus caulinorum similibus . . . . . *T. fallax.*
   Foliis margine insigniter revolutis, perichætialibus caulinorum dissimilibus . . *T. revoluta.*
10. Foliis apiculatis, perichætialibus caulinorum similibus *T. unguiculata.*
    Foliis muticis, perichætialibus caulinorum dissimilibus *T. convoluta.*

## XIV. ENCALYPTA.

1. Dentibus longissimis, capsula spiraliter striata *E. streptocarpa.*
   Dentibus brevibus, capsula lævi, vel longitudinaliter striata. 2.
2. Foliis obtusis, mucronulatis, calyptra basi integra *E. vulgaris.*
   Foliis acuminatis, calyptra ciliata . . . *E. ciliata.*

## XV. GRIMMIA.

1. Seta perichætio immersa. 2.
   Seta exserta. 3.

2. Foliis ovato-lanceolatis, perichætialibus nervo evanescente . . . . . *G. apocarpa.*
   Foliis lanceolato-subulatis, perichætialibus, nervo apicem attingente . . . . *G. maritima.*

3. Seta curvata. 4.
   Seta recta. 5.

4. Foliis lineari-subulatis, apicibus concoloribus *G. saxicola.*
   Foliis ellipticis, acumine diaphano piliformi *G. pulvinata.*

5. Foliis acuminatis, apicibus concoloribus, capsula turbinata . . . . . *G. Daviesii.*
   Foliorum acumine diaphano piliformi. 6.

6. Peristomii dentibus omnibus integerrimis *G. Donniana.*
   Peristomii dentibus sæpissime fissis . *G. ovata.*

## XVI. PTEROGONIUM.

1. Foliis lingulatis obtusis, seta brevi . *Pt. Smithii.*
   Foliis ovatis, acutis, seta elongata. 2.

2. Foliis late ovatis, marginibus planis, operculo conico *Pt. gracile.*
   Foliis ovato-subacuminatis, marginibus recurvis, operculo rostrato . . . . *Pt. filiforme.*

## XVII. WEISSIA.

1. Capsula apophysi instructa. 2.
   Capsula apophysi nulla. 3.

(*Capsula apophysata.*)

2. Foliis ligulatis, apice rotundatis, peristomii dentibus brevibus, rectis . . . . *W. splachnoides.*
   Foliis ovato-lanceolatis, acutis, peristomii dentibus horizontalibus . . . . *W. Templetoni.*

(*Capsula exapophysata.*)

3. Foliis ovatis lanceolatisve. 4.
   Foliis linearibus subulatisve. 8.

** Foliis ovatis lanceolatisve.*

4. Foliis enervibus . . . *Weissia nuda.*
   Foliis uninervibus. 5.

5. Capsula cernua . . . *W. nigrita.*
   Capsula erecta. 6.

6. Operculo rostrato . . . *W. lanceolata.*
   Operculo conico. 7.

7. Peristomii dentibus acutis . . *W. Starkeana.*
   Peristomii dentibus obtusis . . *W. affinis.*

*** Foliis linearibus subulatisve.*

8. Capsula striata. 9.
   Capsula lævi. 10.

9. Foliis linearibus denticulatis . . *W. striata.*
   Foliis lanceolato-setaceis, integerrimis *W. trichodes.*

10. Foliorum marginibus revolutis . . *W. cirrata.*
    Foliorum marginibus planis incurvisve. 11.

11. Capsula subcylindracea . . *W. curvirostra.*
    Capsula ovata. 12.

12. Foliis siccitate crispatis. 13.
    Foliis siccitate strictis vel paululum curvatis. 14.

13. Foliis subfalcatis, lanceolato-subulatis, caule ramoso *W. crispula.*
    Foliis undique divergentibus, lineari-subulatis, caule subsimplice . . . *W. controversa.*

14. Foliis obtusis, nervo latissimo . *W. calcarea.*
    Foliis acutis, nervo mediocri. 15.

15. Caule subnullo. 16.
    Caule elongato. 17.

16. Pedicello curvato . . . *W. recurvata.*
    Pedicello semper recto . . *W. pusilla.*

17. Foliis teneris, planiusculis, capsula ovata *W. verticillata.*
    Foliis rigidis, canaliculatis, capsula turbinata *W. acuta.*

## XVIII. DICRANUM.

1. Foliis bifariam insertis (verticalibus). 2.
   Foliis undique insertis. 4.

(*Foliis bifariis, verticalibus.*)

2. Seta terminali . . . *Dicranum bryoides.*
   Seta laterali vel basilari. 3.

3. Foliis subintegerrimis, seta basilari *D. taxifolium.*
   Foliis serratis, seta plerumque medium versus inserta *D. adiantoides.*

(*Foliis undique insertis.*)

* *Nervo nullo.*

4. Foliis enervibus . . . . *D. glaucum.*
   Foliis uninervibus. 5.

** *Foliis nervosis.*

† *Foliis apiculatis.*

5. Foliis apiculatis . . . *D. latifolium.*
   Foliis muticis. 6.

†† *Foliis muticis.*

6. Foliorum nervo latissimo. 7.
   Foliorum nervo tenui. 9.

← *Foliorum nervo latissimo.*

7. Foliis insigniter falcato-secundis . *D. longifolium.*
   Foliis subsecundis, vel undique vergentibus. 8.

8. Pedicello recto, capsula lævi . *D. cerviculatum.*
   Pedicello arcuato, capsula striata . *D. flexuosum.*

← ← *Foliorum nervo angusto.*

9. Capsula strumosa. 10.
   Capsula estrumosa. 13.

§ *Capsula strumosa.*

10. Foliis undique vergentibus. 10.
    Foliis falcato-secundis. 12.

11. Capsula oblongo-lævi . . . *D. virens.*
    Capsula ovata, sulcata . . *D. strumiferum.*

12. Capsula obovata . . . *D. falcatum.*
    Capsula ovata, oblonga . . *D. Starkii.*

§ § *Capsula estrumosa.*

13. Foliis undique recurvato-patentibus. 14.
    Foliis nunquam recurvato-patentibus. 16.

14. Capsulis erectis . . *Dicranum flavescens.*
Capsulis cernuis. 15.

15. Foliis squarrosis . . *D. squarrosum.*
Foliis omnibus patentibus . *D. pellucidum.*

16. Foliis ovato-lanceolatis . . *D. spurium.*
Foliis anguste lanceolatis subulatisve. 17.

17. Foliis undique divergentibus. 18.
Foliis secundis. 20.

18. Caule subnullo, foliis etiam madore cuspatis *D. crispum.*
Caule elongato, foliis siccitate solummodo crispatis. 19.

19. Capsulis oblongo-cylindraceis . *D. Scottianum.*
Capsula ovata, basi attenuata . *D. polycarpum.*

20. Capsulis cylindraceis. 21.
Capsulis ovatis. 22.

21. Foliis late subulatis, carinatis . *D. undulatum.*
Foliis anguste subulatis, canaliculatis *D. scoparium.*

22. Foliis subsecundis, hastato-lanceolatis . *D. varium.*
Foliis falcato-secundis, subulatis. 23.

23. Foliis omnino subulatis . . *D. heteromallum.*
Foliis e lata basi subulato-setaceis . *D. subulatum.*

## XIX. TRICHOSTOMUM.

1. Pedicello curvato . . . . *Tr. patens.*
Pedicello recto. 2.

2. Foliis apice diaphanis. 3.
Foliis apice concoloribus. 6.

3. Peristomii dentibus omnibus bipartitis. 4.
Peristomii dentibus inæqualiter divisis. 5.

4. Foliis longissime acuminatis, dentato-ciliatis *Tr. lanuginosum.*
Foliis acuminatis, serratis . . *Tr. canescens.*

5. Capsula oblonga; foliis recurvis, acumine diaphano longiusculo . . . *Tr. heterostichum.*
Capsula ovata; foliis erecto-patentibus, acumine diaphano, brevi . . *Tr. microcarpum.*

6. Foliis ovatis, obtusis . . . *Tr. aciculare.*
Foliis lanceolatis subulatisve, acuminatis. 7.

7. Foliis lanceolato-subulatis, siccitate tortilibus *Trichostomum polyphyllum.*
   Foliis lanceolatis, nunquam tortilibus. 8.

8. Caule brevi, subsimplice; foliis strictis, marginibus planis, capsula elliptica . . *Tr. ellipticum.*
   Caule elongato, ramoso; foliis revolutis, margine recurvis, capsula oblongo-ovata . *Tr. fasciculare.*

## XX. LEUCODON.

*L. sciuroides.*

## XXI. DIDYMODON.

1. Capsulis inclinatis. 2.
   Capsulis erectis. 3.

2. Foliis lanceolato-acuminatis; peristomii dentibus 32, hic illic per trabes unitis . . *D. purpureum.*
   Foliis subulatis; peristomii dentibus 16, sæpe longitudinaliter perforatis . . . *D. inclinatum.*

3. Foliis ovatis. 4.
   Foliis lanceolatis subulatisve. 5.

4. Foliis strictis, integerrimis . . *D. nervosum.*
   Foliis flexuosis, serratis . . *D. flexifolium.*

5. Foliis subulatis, operculo conico. 6.
   Foliis anguste lanceolatis, operculo rostrato. 7.

6. Caule elongato; foliis subdistichis, subulato-setaceis *D. capillaceum.*
   Caule brevi; foliis subsecundis, subulatis *D. heteromallum.*

7. Foliis undique imbricatis, acuminatis, rigidis; nervo excurrente . . . . *D. rigidulum.*
   Foliis trifariis, obtusiusculis, flaccidis; nervo vix ad apicem attingente . . . *D. trifarium.*

## XXII. FUNARIA.

1. Foliis integerrimis, seta hygrometrica *F. hygrometrica.*
   Foliis serratis, seta semper stricta. 2.

2. Foliis concavis, acuminulatis . *F. Muhlenbergii.*
   Foliis planis, longe acuminatis . *F. hibernica.*

## XXIII. ZYGODON.

Z. *conoideum*.

## XXIV. ORTHOTRICHUM.

1. Ciliis nullis. 2.
   Ciliis 8, vel 16. 3.

(*Ciliis nullis*.)

2. Pedicello exserto, dentibus 8, germinatis *O. anomalum*.
   Pedicello subimmerso, dentibus 16, distinctis *O. cupulatum*.

3. Ciliis 8. 4.
   Ciliis 16. 6.

(*Ciliis* 8.)

4. Foliis crispatis . . . . . *O. crispum*.
   Foliis non crispatis. 5.

5. Pedicello exserto . . *O. Hutchinsiæ*.
   Pedicello immerso . . . . . *O. affine*.

(*Ciliis* 16.)

6. Foliis apice serrulatis, diaphanis . *O. diaphanum*.
   Foliis integerrimis, apicibus concoloribus.

7. Ciliis setaceis. 8.
   Ciliarum articulis latioribus.

8. Capsula exserta; foliis siccitate crispatis *O. pulchellum*.
   Capsula immersa; foliis non crispatis . *O. rivulare*.

9. Foliis lanceolatis; capsulis ovatis, lævibus *O. striatum*.
   Foliis lineari-lanceolatis; capsulis oblongis, striatis *O. Lyellii*.

## XXV. NECKERA.

1. Foliis ovato-acuminatis, concavis, marginibus recurvis *N. pumila*.
   Foliis oblongis, apiculatis, undulatis, marginibus planis *N. crispa*.

## XXVI. ANOMODON.

1. Foliis ovatis, acutis, serrulatis, nervo evanescente *A. curtipendulum.*
   Foliis late ovatis, lanceolatis, obtusis, nervo attingente *A. viticulosum.*

## XXVII. DALTONIA.

1. Foliis oblongo-lanceolatis, seta elongata, calyptra fimbriata . . . . . *D. splachnoides.*
   Foliis late ovatis, acutis, seta perbrevi, calyptra basi multifida . . . . . *D. heteromalla.*

## XXVIII. FONTINALIS.

1. Foliis uninervibus . . . *F. capillacea.*
   Foliis enervibus. 2.
2. Foliis complicato-carinatis . . *F. antipyretica.*
   Foliis lanceolatis, acuminatis, planis . *F. squamosa.*

## XXIX. BUXBAUMIA.

*B. aphylla.*

## XXX. BARTRAMIA.

1. Seta semper terminali. 2.
   Seta demum laterali. 3.
2. Foliis subulatis, serratis, nervo excurrente *B. pomiformis.*
   Foliis setaceo-subulatis, vix serratis, nervo evanescente *B. ithyphylla.*
3. Seta longiore, stricta. 4.
   Seta brevi, arcuata. 5.
4. Foliis lineari-lanceolatis, recurvo-patentibus *B. gracilis.*
   Foliis ovatis lanceolatisve, strictis . *B. fontana.*
5. Foliis e lata basi longissime subulatis *B. Halleriana.*
   Foliis lanceolato-acuminatis . . *B. arcuata.*

## XXXI. HOOKERIA.

1. Foliis obsoletissime binervibus . . *H. lucens.*
   Foliis binervibus, nervo sub apicem evanescente *H. læte-virens.*

## XXXII. HYPNUM.

1. Surculis planis. 2.
   Surculis teretiusculis. 6.

(*Surculis planis.*)

2. Capsulis erectis. 3.
   Capsulis cernuis inclinatisve. 4.

3. Foliis acinaciformibus, apice serrulatis, mediotenus uninervibus . . . . *H. trichomanoides.*
   Foliis oblongis integerrimis, enervibus *H. complanatum.*

4. Foliis uninervibus . . *H. riparium.*
   Foliis enervibus vel basi binervibus. 5.

5. Capsula striata . . . . *H. undulatum.*
   Capsula lævi . . . . *H. denticulatum.*

(*Surculis teretiusculis.*)

6. Foliis undique divergentibus. 7.
   Foliis falcato-secundis. 49.

A. *Foliis undique divergentibus.*

7. Foliis directione æquali*. 8.
   Foliis squarrosis. 43.

* *Foliis directione æquali.*

8. Foliorum nervo percurrente vel excedente. 9.
   Foliorum nervo evanescente vel nullo. 13.

† *Foliorum nervo excurrente.*

9. Foliis integerrimis. 10.
   Foliis serratis. 12.

10. Foliorum margine recurvo . . *H. medium.*
    Foliorum margine plano. 11.

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* This term is used in opposition to *squarrose*, and is intended to imply that the leaves are alike in their direction. It is very different from *secund.*

11. Foliis lanceolato-subulatis, fasciculatis *Hypnum tenellum.*
Foliis ovato-lanceolatis, sparsis . *H. serpens.*

12. Foliis lanceolato-acuminatis . . *H. populeum.*
Foliis cordato-acuminatis . . *H. reflexum.*

†† *Foliorum nervo evanescente vel nullo.*

13. Foliis integerrimis vel subintegerrimis. 14.
Foliis serratis. 28.

← *Foliis integerrimis.*

14. Foliis ovatis vel ellipticis. 15.
Foliis lanceolatis subulatisve. 21.

§ *Foliis ovatis vel ellipticis.*

15. Foliis obsolete binervibus. 16.
Foliis mediotenus uninervibus. 18.

16. Foliis arcte imbricatis, valde concavis *H. moniliforme.*
Foliis laxis, vix concavis. 17.

17. Foliis late ovatis, obtusis . . *H. molle.*
Foliis ellipticis, apiculatis . . *H. Schreberi.*

18. Foliis obtusis . . . *H. stramineum.*
Foliis plus minusve acutis. 19.

19. Foliis breviter acuminatis, dorso papilloso *H. rigidulum.*
Foliis apiculatis, lævibus. 20.

20. Caule vage ramoso, operculo longe rostrato *H. murale.*
Caule pinnato, operculo conico-acuto . *H. purum.*

§§ *Foliis lanceolatis subulatisve.*

21. Foliis estriatis. 22.
Foliis striatis. 24.

‡ *Foliis estriatis.*

22. Foliis lanceolato-subulatis . . *H. fluitans.*
Foliis late lanceolatis. 23.

23. Foliis mediotenus uninervibus . *H. plumosum.*
Foliis obsoletissime binervibus vel enervibus *H. pulchellum.*

‡‡ *Foliis striatis.*

24. Foliis subenervibus . . . *H. rufescens.*
Foliis uninervibus. 25.

25. Capsulis erectis . . . *Hypnum sericeum.*
Capsulis cernuis. 26.

26. Seta scabra . . . *H. lutescens.*
Seta lævi. 27.

27. Foliis lanceolatis, longe acuminatis . *H. nitens.*
Foliis ovato-lanceolatis, acuminatis . *H. albicans.*

← ← *Foliis serratis.*

28. Caule inferne denudato. 29.
Caule ubique folioso. 30.

§ *Caule inferne denudato.*

29. Capsula inclinata . . . *H. alopecurum.*
Capsula erecta . . . *H. dendroides.*

§ § *Caule ubique folioso.*

30. Capsula erecta. 31.
Capsula cernua. 32.

31. Foliis ellipticis, apice serrulatis . *H. curvatum.*
Foliis ovato-acuminatis, serrulatis . *H. myosuroides.*

32. Caule bi-tripinnato. 33.
Caule pinnato, vel vage ramoso. 35.

‡ *Caule bi-tripinnato.*

33. Foliis basi obsolete binervibus, apice subserrulatis *H. splendens.*
Foliis uninervibus, serrulatis. 34.

34. Caule tripinnato, foliis dorso papillosis *H. proliferum.*
Caule subbipinnato, foliis lævibus . *H. prælongum.*

‡ ‡ *Caule pinnato vel vage ramoso.*

35. Caule pinnato. 36.
Caule vage ramoso. 38.

36. Foliis obsolete binervibus . . *H. flagellare.*
Foliis uninervibus. 37.

37. Foliis dorso papillosis . . *H. abietinum.*
Foliis lævibus . . . *H. Blandovii.*

38. Foliis valde concavis, longe apiculatis *H. piliferum.*
Foliis planiusculis, acuminatis. 39.

39. Operculo conico. 40.
Operculo rostrato. 41.

40. Foliis late ovatis . . *Hypnum Rutabulum.*
Foliis cordatis . . . *H. velutinum.*

41. Foliorum nervo ante apicem evanescente *H. ruscifolium.*
Foliis mediotenus uninervibus. 42.

42. Foliis patentibus, cordatis, striatis . *H. striatum.*
Foliis erecto-patentibus, ovatis, estriatis *H. confertum.*

** *Foliis squarrosis.*

43. Foliis breviter acuminatis. 44.
Foliis longe acuminatis. 45.

44. Foliis ovatis, subenervibus . . *H. cuspidatum.*
Foliis ovato-cordatis, nervo ante apicem evanescente *H. cordifolium.*

45. Foliis uninervibus . . *H. polymorphum.*
Foliis enervibus, vel basi binervibus. 46.

46. Foliis integerrimis . . *H. stellatum.*
Foliis serrulatis. 47.

47. Foliis lanceolato-acuminatis . *H. loreum.*
Foliis cordato-acuminatis. 48.

48. Foliis rectiusculis . . . *H. triquetrum.*
Foliis e basi vaginante recurvis . *H. squarrosum.*

B. *Foliis falcato-secundis.*

49. Foliis uninervibus. 50.
Foliis enervibus, vel subbinervibus. 56.

* *Foliis uninervibus.*

50. Foliorum nervo percurrente . . *H. filicinum.*
Foliorum nervo evanescente. 51.

51. Foliis integerrimis. 52.
Foliis serratis. 54.

52. Foliorum nervo perbrevi . . *H. palustre.*
Foliorum nervo ultra medium evanescente. 53.

53. Foliis cordato-ovatis, attenuatis, curvatis, margine reflexo *H. atro-virens.*
Foliis lanceolatis, acuminatis, falcatis, margine inflexo *H. aduncum.*

54. Foliis falcatis, transversim undulatis . *H. rugulosum.*
Foliis uncinatis, longitudinaliter striatis vel lævibus. 55.

55. { Foliis lanceolato-subulatis . *Hypnum uncinatum.*
Foliis cordatis, longe acuminatis. *H. commutatum.*

** *Foliis enervibus vel subbinervibus.*

56. { Foliis integerrimis, vel apice obsolete serrulatis. 57.
Foliis evidentissime serrulatis. 58.

57. { Foliis obtusis . . . . *H. scorpioides.*
Foliis acuminatis . . *H. cupressiforme.*

58. { Caule vage ramoso . . *H. silesianum.*
Caule pectinato. 59.

59. { Foliis striatis . . . *H. Crista-castrensis.*
Foliis estriatis . . . *H. molluscum.*

## XXXIII. BRYUM.

1. { Capsulis sulcatis. 2.
Capsulis lævibus. 3.

(*Capsulis sulcatis.*)

2. { Foliis apice solummodo serratis, capsula cylindracea, erectiuscula . . . *Br. androgynum.*
Foliis subserrulatis, capsula ovato-cylindracea, inclinata *Br. palustre.*

(*Capsulis lævibus.*)

3. { Peristomii dentibus brevibus. 4.
Peristomii dentibus ciliis æqualibus. 6.

* *Dentibus brevibus.*

4. { Foliis linearibus, obtusis . . *Br. trichodes.*
Foliis lanceolatis, acutis. 5.

5. { Foliis ovato-lanceolatis, carinatis, serratis *Br. triquetrum.*
Foliis lanceolatis, planis, subintegerrimis *Br. dealbatum.*

** *Dentibus longis.*

6. { Foliis subulatis . . . *Br. pyriforme.*
Foliis minime subulatis. 7.

7. { Foliis immarginatis. 8.
Foliis evidentissime marginatis. 20.

8. { Foliis magis minusve obtusis . *Bryum julaceum.*
   { Foliis acuminatis. 9.

† *Foliis immarginatis.*

9. { Foliorum nervo evanescente. 10.
   { Foliorum nervo excurrente. 11.

+ *Foliorum nervo evanescente.*

10. { Foliis ovatis, obsolete reticulatis . *Br. crudum.*
    { Foliis lanceolatis, evidentissime reticulatis *Br. carneum.*

11. { Foliis rotundatis, ventricosis. 12.
    { Foliis magis minusve ovatis lanceolatisve. 13.

12. { Foliis longe acuminatis, capsulis ovatis *Br. argenteum.*
    { Foliis breviter acuminatis, capsulis longicollis clavatis *Br. Zierii.*

+ + *Foliorum nervo excurrente.*

13. { Foliis obovatis. 14.
    { Foliis ovatis lanceolatisve. 15.

14. { Foliis serratis, subapiculatis . . *Br. roseum.*
    { Foliis integerrimis, piliferis . . *Br. capillare.*

15. { Foliis ovatis, acuminatis. 16.
    { Foliis oblongis lanceolatisve. 17.

16. { Capsula oblongo-pyriformi . *Br. cæspiticium.*
    { Capsula elongato-pyriformi . *Br. turbinatum.*

17. { Caule brevi. 18.
    { Caule elongato. 19.

18. { Capsula oblongo-pyriformi, pendula . *Br. nutans.*
    { Capsula elongato-clavata, inclinata . *Br. elongatum.*

19. { Foliis rigidis, obtusiusculis . . *Br. alpinum.*
    { Foliis flaccidis, acutis . . *Br. ventricosum.*

* * *Foliis evidentissime marginatis.*

20. { Foliis integerrimis . . *Br. punctatum.*
    { Foliis denticulatis. 21.

21. { Foliis ligulatis . . . *Br. ligulatum.*
    { Foliis ovatis rotundatisve. 22.

22. { Operculo rostrato. 23.
    { Operculo convexo-mammillato. 24.

23. { Foliis rotundatis . . *Bryum rostratum.*
Foliis ovatis lanceolatisve . *Br. marginatum.*

24. { Foliis lanceolatis . . . *Br. hornum:*
Foliis obovatis . . *Br. cuspidatum.*

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# ADDENDA ET EMENDANDA.

Page 11. Under *Gymnostomum curvirostrum* add *Dicranum hyperboreum.* Engl. Bot. t. 2552?

Page 38. We ought to have observed under *Dicranum varium* that the *Bryum pusillum* of Dickson proves to be only this plant; and it is only upon the authority of Mr. Dickson's specimens that *Trichostomum pusillum* Hedw. (*Didymodon*) is considered a British native. That plant must therefore be excluded from the British Flora. The English Botany figures are taken from foreign specimens.

Page 59. Under *Dicranum heteromallum* read *Dicranum interruptum.* Engl. Bot. t. 2508.

Page 61, line 20, *for* n. 19, *read* n. 119.

Page 61, line 34, *for* capsule oblong, *read* capsule ovate.

Page 62. Under *Trichostomum polyphyllum* add as a synonym *Encalypta crispata.* Hedw. Sp. Musc. t. 10. f. 1—9. Upon the authority of specimens which we have received from Dr. Swartz, as well as from a comparison with the figure and description, we are satisfied that *Encalypta crispata* of Hedwig is only our *Trichostomum polyphyllum*; and we have received it not only from the Cape of Good Hope, but also from the Canary Islands and from the Pyrenées.

Page 64. We have received plants of *Leucodon Canariense* (Schwaegrichen) from our late lamented friend Professor Schmidt of Norway, which he gathered in the Canary Islands; and we can safely assert that it does not belong to this genus; so that the *Leucodon sciuroides* is the only species of the genus hitherto discovered, and it consequently ought to have no specific character.

Page 67. Under *Didymodon rigidulum* add as a synonym *Trichostomum lineare.* Engl. Bot. t. 1598.

Page 70. Under the genus Zygodon, *read*—We have lately had the opportunity of examining the peristome of this curious moss, and of confirming the observations of our friend Mr. Templeton relative to the structure of its teeth. There are filiform processes arising from the sides of the larger teeth, exactly as in most of the *Orthotricha.*

Page 83. After the description of *Fontinalis squamosa*, read—We have never seen *F. antipyretica* otherwise than in standing waters, or those which had a very slow motion, whilst *F. squamosa* we have constantly found in mountain streams, where the motion of the water was considerable. In Lough Bray *F. antipyretica* only is found, and in the stream which issues from it and tumbles down the steep side of the mountain, only *F. squamosa*; yet they both fructify in their situations.

# BRITISH MOSSES.

## 1. ANDRÆA.

GEN. CHAR. *Capsule* four-valved, the valves cohering at the extremity by means of the persistent *Lid*; *Calyptra* irregularly torn. (TAB. I.)

THIS curious genus, confined, we believe, wholly to the more alpine parts of Europe, has some striking points in common with the *Jungermanniæ*, particularly in the four-valved capsule and the irregularly torn calyptra. This capsule has, however, a central columella, and is terminated by an evident operculum, though a persistent one. That part which has been called by most authors a pedicellus or seta, is in fact nothing more than an elongated receptacle (as may be seen by our figure), upon which are seen barren pistilla, and from the *summit* of which, at the very base of the capsule, the calyptra has its origin: thus is its capsule truly sessile; and, among the Mosses, comes in this particular very near to *Sphagnum*, whose receptacle is pedunculated; its flat, dilated extremity bearing not only the capsule but also the barren pistilla.

All the species (and Britain can boast of all) are remarkable for their dark brown or almost black colour.

### * *Leaves destitute of a nerve.*

1. *A. alpina*; stems branched, leaves obovate, suddenly acuminated, straight, imbricating the stem on every side. (TAB. VIII.)

A. alpina. *Hedw. Sp. Musc. p.* 49. *Turn. Musc. Hib. p.* 13. *Hook. in Linn. Trans. v.* 10. *p.* 388. *t.* 31. *f.* 1. *Moug. et Nestl. n.* 116. Jungermannia alpina. *Linn.—Dill. Musc. t.* 83. *f.* 39.

HAB. Ireland, Wales, and Scotland, upon rocks, but not common.

This species varies in the looseness or compactness of growth, in the stems as well as in the leaves, and somewhat in the colour of the latter, which we have now and then seen in shady situations of a yellowish brown.

2. *A. rupestris*; stems branched, leaves ovate, gradually acuminated, the upper ones falcate. (TAB. VIII.)

A. rupestris. *Hedw. Sp. Musc. p.* 47. *t.* 7. *f.* 2. *Engl. Bot. t.* 1277. (not Fl. Brit.) *Hook. in Linn. Trans. v.* 10. *p.* 391. *t.* 31. *f.* 2. Jungermannia rupestris. *Linn.*

HAB. On rocky mountains throughout Great Britain.

The accurate Dr. Mohr was the first, we believe, satisfactorily to distinguish this species, which in size comes nearest to *A. Rothii*, but in the structure of the leaves, and especially in the absence of a nerve, to *A. alpina*. From this the form of the leaves, with their direction, and the diminutive size of the whole plant, keep it sufficiently apart.

** *Leaves furnished with a nerve.*

3. *A. Rothii*; stems almost simple, leaves lanceolato-subulate, falcato-secund, fragile; perichætial ones oblong, nerveless, their margins involute. (TAB. VIII.)

A. Rothii. *Mohr Fl. Crypt. Germ. t.* 11. *f.* 7-9. *Engl. Bot. t.* 2162. *Hook. in Linn. Trans. v.* 10. *p.* 393. *t.* 31. *f.* 3. *Moug. et Nestl. n.* 116. A. rupestris. *Turn. Musc. Hib. p.* 14. *Smith Fl. Brit. p.* 1178.—*Dill. Musc. t.* 83. *f.* 40.

HAB. Alpine rocks, common.

4. *A. nivalis*; stems slightly branched, leaves loosely imbricated, lanceolate, subfalcate, secund; perichætial ones similar to the cauline ones. (TAB. VIII.)

A. nivalis. *Hook. in Linn. Trans. v.* 10. *p.* 395. *t.* 31. *f.* 4. *Engl. Bot. t.* 2507.

HAB. On rocks upon the highest summit of Ben Nevis in Scotland, at the eastern end.

The present fine species has been no where found in Britain except in the station above mentioned. On the most elevated of the Swiss alps we have seen it upon the granite rocks, retaining all the characters of the Scotch specimens. In size it exceeds all the rest of the genus; and individuals with very falcate leaves bear a striking resemblance to *Jungermannia juniperina*. In its leaves it approaches to the *Andræa* last described; but their form is lanceolate, by no means subulate; their texture thinner, flexile; their colour

paler; those of the perichætium do not differ from the cauline ones, whilst the very reverse is the case with *A. rupestris*, as may be seen both by our description and figures.

## 2. SPHAGNUM.

GEN. CHAR. *Receptacle* pedunculated, peduncle resembling a fruitstalk. *Capsule* sessile, entire, its *Lid* deciduous, its *Mouth* naked; *Calyptra* irregularly torn. (TAB. I.)

In this as well as in the preceding genus the capsule is sessile, being entirely destitute of a real fruitstalk. That which appears like one is the footstalk of the receptacle, which in most of the *Sphagna* is so much lengthened out as greatly to exceed the perichætial leaves. All the species as they are at present considered were by Linnæus and the older botanists comprised under the name of *S. palustre*; and all agree in the peculiar structure of the leaves, in their reticulation being large, and the interstices or areolæ oblong, interrupted by transverse lines. All, too, are destitute of a nerve, and are of a singularly whitish colour, coming nearest to those of *Dicranum glaucum* and its exotic affinities, and to *Octoblepharis albida*.

They grow universally in bogs, and frequently in water; and are found in various parts of the globe.

The sessile capsule and irregularly bursting calyptra distinguish the present genus from *Gymnostomum*, and the entire capsule and deciduous lid from *Andræa*.

1. *S. obtusifolium*; branches tumid; leaves ovate, obtuse. (TAB. IV.)

*α. vulgaris*; stems loosely tufted, 7 or 8 inches long, leaves closely imbricated.

S. obtusifolium. *Ehrh. Crypt. n.* 241. (according to Smith.) *Hoffm. Germ. v.* 2. *p.* 21. S. latifolium. *Hedw. Turn. Musc. Hib. p.* 5. *Engl. Bot. t.* 1405. *Moug. et Nestl. n.* 113. S. cymbifolium. *Swartz Musc. Suec.* S. palustre *α. Linn.—Dill. Musc. t.* 32. *f.* 1.

*β. minus*; stems densely tufted, 2 or 3 inches long; leaves closely imbricated. S. compactum. *Schwaegr. Suppl. t.* 3.

*γ. fluitans*; stems much lengthened out, 2 feet long, slender; leaves scattered, remote. S. latifolium *β.* fluitans. *Turn. Musc. Hib. p.* 6.

HAB. Bogs, common.

Many botanists, led by the remarkable similarity of the capsules, and the peculiar structure of the leaves common to the *Sphagna*, have been disposed to consider them all as mere varieties of the same species. Some have even affirmed that they have seen all the intermediate states. This may be the case; but as we have observed large patches of *Sphagna* preserving a peculiar character in the shape of their leaves, and this though other patches with leaves of a different structure are frequently adjoining to them, we must, until the intermediate states be fairly presented to us, in conformity to most modern muscologists, separate them into species. On the other hand, the present plant may caution us from the opposite extreme of multiplying species unnecessarily. We can scarcely perceive any difference between this, the *Sphagnum oblongum* of Palisot de Beauvois, and *S. compactum* of Schwaegrichen. The occasional erosion of the tops of the leaves, a circumstance to be expected from their delicate structure and exposure to the frequent vicissitudes of temperature, can yield no character of importance as insisted on by Schwaegrichen. Vid. his *Suppl. pars* 1. *t.* 3. The var. *fluitans* we have taken from Mr. Turner, who says that its habit is very different from the common appearance of the plant.

2. *S. squarrosum*; branches attenuated at their extremities; leaves ovato-acuminated, squarrose, recurved. (TAB. IV.)

S. squarrosum. *Web. & Mohr It. Suec. t.* 2. *f.* 1. *a. b. Engl. Bot. t.* 1498. *Moug. et Nestl. n.* 209.

HAB. Bogs, not rare.

Scarcely is this species to be distinguished from the preceding one, but by the more acuminated leaves, and their being bent back in so remarkable a manner as to give the whole plant a very squarrose appearance.

3. S. *acutifolium*; branches attenuated; leaves ovato-lanceolate, crowded. (TAB. IV.)

S. acutifolium. *Ehrh. Crypt. n.* 72. (according to Smith.) *Schwaegr. Suppl. t.* 5. S. capillifolium. *Hedw. Turn. Musc. Hib. p.* 6. *Engl. Bot. t.* 1406. *Moug. et Nestl. n.* 11.—*Dill. Musc. t.* 32. *f.* 2. A.

HAB. Bogs, extremely common.

4. S. *cuspidatum*; branches attenuated; leaves lanceolato-subulate, lax. (TAB. IV.)

S. cuspidatum. *Ehrh. Crypt. n.* 25. (according to Smith.) *Schwaegr. Suppl. t.* 6. *Turn. Musc. Hib. p.* 6. *Engl. Bot. t.* 2392. *Moug. et Nestl. n.* 405.—*Dill. Musc. t.* 32. *f.* 2. B.

HAB. Bogs, not rare, generally growing in the water.

The difficulty of finding this plant in fructification, joined to its generally growing in water, would afford a very strong reason for considering it as a variety of *S. acutifolium*, if the difference of shape in the leaves were not too striking.

## 3. PHASCUM.

GEN. CHAR. *Fruitstalks* terminal; *Lid* persistent; *Calyptra* dimidiate. (TAB. I.)

This genus contains not only species which are amongst the most minute of the Mosses, and often scarcely discernible with the naked eye, but such as are extremely dissimilar in general appearance to each other. *P. serratum* is remarkable for its conferva-like shoots, and *P. alternifolium* for the structure of its fruit, while the rest have the leaves either subulate or broad and ovate; and these latter may be divided into such as have the fruit immersed in the perichætial leaves, and such as have it considerably exserted beyond them. By *P. bryoides* this genus is closely allied to the following.

* *Shoots creeping, leafless, articulated, branched.*

1. *P. serratum*; shoots branched, conferva-like; perichætial leaves lanceolate, serrated, nerveless. (TAB. V.)

P. serratum. *Schreb. de Phasc. t.* 2. *Engl. Bot. t.* 460. *Turn. Musc. Hib. p.* 4. *Dicks. Crypt. fasc.* 1. *t.* 1. *f.* 1. P. stoloniferum. *Dicks. Crypt. fasc.* 3. *t.* 7. *f.* 2. *Hed. Engl. Bot. t.* 2006.

HAB. Shaded sandy banks.

Under this species is to be included *P. stoloniferum* of Dickson, which has already judiciously been made a variety of *P. serratum* by Mr. Turner in his *Musc. Hib.* and which seems to differ solely in the lower parts of the shoots being browner, and the joints there nearly obsolete. The only leaves of this plant form its *perichætium*, and vary somewhat in their serratures and their more or less acuminated points. *P. cohærens* Hedw. and *P. crassinervium* Schwaegr. differ in having a strong nerve to the leaf, while the leaves

of our plants are nerveless. Sprengel and Schwaegrichen have taken the conferva-like shoots for real *Confervæ*; but in all the specimens that we have examined they appear most assuredly to be a part of the plant. The capsules contain about 100 seeds; these are large in proportion to those of other *Phasca*, except *P. alternifolium* alone. The seeds are somewhat angular, rather pellucid, as if portions of the cellules were still attached to them. There is no columella; the interior membrane is very delicate, the exterior thin and strongly marked with reticulations.

** *Creeping shoots none.*

† *Leaves more or less subulate.*

2. *P. alternifolium*; leaves entire, lanceolato-subulate; innovations elongated. (Tab. V.)

P. alternifolium. *Dicks. Crypt. fasc.* 1. *p.* 2. *t.* 1. *f.* 2. *Engl. Bot. t.* 2107.

Hab. Moist banks.

This plant is remarkable for its slender, lengthened shoots, the distant and alternate position of the leaves, and for the fruit being immersed in perichætial leaves, which are larger and much longer than the cauline ones, and which appear lateral from the prolongation of a shoot. Barren stems are not unlike those of *Dicranum varium*. The seeds are about 16 in each capsule, very large, greenish, angular, without border. The capsule itself is between membranaceous and carnose, faintly reticulated, greenish, semi-pellucid, so that the seeds are seen within, as intended to be represented in a young state in *Engl. Bot.* Sometimes two or more capsules are seen in the same perichætium.

3. *P. crispum*; leaves lanceolato-subulate, flexuose, crisped when dry. (Tab. V.)

P. crispum. *Hedw. St. Cr. v.* 1. *t.* 9. *Turn. Musc. Hib. p.* 2. *Engl. Bot. t.* 1680. P. multicapsulare. *Engl. Bot. t.* 618.

Hab. Banks and fields.

*P. multicapsulare* is by no means, as we think, to be distinguished from *P. crispum*.

4. *P. subulatum*; leaves subulato-setaceous, straight, their nerve disappearing below the point. (Tab. V.)

P. subulatum. *Linn. Sp. Pl. p.* 1570. *Hedw. St. Cr. v.* 1. *t.* 35. *Turn. Musc. Hib. p.* 1. *Engl. Bot. t.* 2177. *Moug. et Nestl. n.* 112.—*Dill. Musc. t.* 32. *f.* 10.

Hab. Dry banks.

5. **P. *axillare***; leaves lanceolato-subulate, straight, their nerve disappearing below the point; fruit at length lateral. (Tab. V.)

P. axillare. *Dicks. Crypt. fasc.* 1. *p.* 2. *t.* 1. *f.* 3. *Turn. Musc. Hib. p.* 1. *Engl. Bot. t.* 1036. P. nitidum. *Hedw. St. Cr. v.* 1. *t.* 34. P. strictum. *Dicks. Crypt. fasc. t.* 10. *f.* 1. *Engl. Bot. t.* 2093.

Hab. Moist banks.

This and the preceding may be recognised from the rest of the genus by their very narrow leaves and usually pale yellow colour. *P. subulatum* is distinguished from *P. axillare* by its more acuminated leaves, their more rigid texture, and stronger nerve. We can perceive no difference between specimens received from Mr. Dickson himself, of *P. strictum* and our *P. axillare*. The serratures of the leaves represented by the author, appear to us to arise from a contraction of the marginal cellules.

†† *Leaves more or less ovate.*

→ *Fruitstalk entirely immersed among the leaves.*

6. ***P. patens***; leaves patent, narrow-ovate, serrated, their nerve disappearing below the point. (Tab. V.)

P. patens. *Hedw. St. Cr. v.* 1. *t.* 10. *Turn. Musc. Hib. p.* 2. *Engl. Bot. t.* 1279. P. recurvifolium. *Dicks.*

Hab. Clay fields.

This plant has remarkably patent leaves, as its name implies; moreover, they are strongly serrated, and their nerves disappear before reaching their points, circumstances which alone would suffice to keep it distinct from *P. cuspidatum*. A slight variety with narrower leaves is the *P. recurvifolium* Dicks. (*P. pachycarpon* Schwaegr.?)

7. ***P. muticum***; leaves ovato-rotundate, acuminate, concave, connivent, the nerve reaching to the point. (Tab. V.)

*α. majus.* Leaves sharply serrated at their points.

P. muticum. *Schreb. de Phasc. t.* 1. *f.* 11-14. *Turn. Musc. Hib. t.* 3. *Engl. Bot. t.* 2027. P. acaulon *β. Linn.—Dill. Musc. t.* 32. *f.* 12.

*β. minus*; leaves entire.

Hab. Moist banks. *β.* Banks near the sea at Torquay, Devon.

This is a species admirably distinguished by its leaves being so connivent about the capsule as to form an ovate bulb. We have found an extremely small variety at Torquay in Devonshire, which we have distinguished above, and which approaches so nearly to the *P. Flörkeanum* of Schwaegrichen, that we find no other difference than that

the leaves of this plant are patent or erect, whilst in ours they are as connivent as in α. Even in the common appearance of the species the serratures at the points of the leaves are subject to considerable variation; but when quite entire, the plant may be known from *P. cuspidatum* by its much more convex leaves, and by their more rigid texture as well as glossy surface.

8. *P. cuspidatum*; leaves ovato-acuminate, erect, their nerve reaching to the point. (Tab. V.)

α. *apiculatum*; leaves apiculate.

P. cuspidatum. *Schreb. de Phasc. t.* 1. *f.* 1-5. *Turn. Musc. Hib. p.* 3. *Engl. Bot. t.* 2025. *Moug. et Nestl. n.* 307. P. Schreberianum. *Dicks.—Engl. Bot. t.* 2026. P. curvisetum. *Dicks.—Engl. Bot. t.* 2259.—*Dill. Musc. t.* 32. *f.* 11.

β. *piliferum*; leaves hair-pointed.

P. piliferum. *Schreb. de Phasc. t.* 1. *f.* 6-10. *Engl. Bot. t.* 1888.

Hab. Hedges and moist banks.

We have here been under the necessity of joining together four species of preceding authors, *P. cuspidatum*, *P. curvisetum*, *P. Schreberianum*, and *P. piliferum*; and probably we should include *P. elatum* Bridel, and *P. carniolicum* Schwaegr.; but having no specimens of these we are not enabled to form a decided opinion. *P. curvisetum* we conceive to be merely an accidental variety, having frequently observed in the same patch individuals with curved and straight fruitstalks. *P. Schreberianum* and *P. piliferum* seem to us to owe their dissimilarities to the soil on which they grow, the former in rich, the latter in barren pastures. The leaves of *P. cuspidatum* have almost always a projecting hair-like point: but this is most remarkable in the variety called *piliferum*, which when growing on barren plains near Yarmouth looks quite hoary, like *Anictangium ciliatum*, and has the leaves singularly short and obtuse. Mohr, whose authority is of the highest importance, retains it as a distinct species, but makes its character to depend on what we do not find to be constant, viz. the curved fruitstalk.

+ + *Fruitstalk exserted.*

9. *P. bryoides*; leaves ovate, apiculate; capsule elliptical. (Tab. V.)

P. bryoides. *Dicks. Pl. Crypt. fasc.* 4. *t.* 10. *f.* 3. *Engl. Bot. t.* 1280.

Hab. Banks and fields.

This might at first be mistaken for a small variety of *Gymnostomum truncatum*, or rather of that appearance

of it which has been called by Mr. Turner *G. intermedium*, before the falling of the lid; but its capsule will be found to have no line of separation for the lid, and the whole assumes very nearly an elliptical figure.

10. *P. rectum*; leaves ovate with a short point; capsule globose; fruitstalk nearly erect. (TAB. V.)

P. rectum. *With. Bot. Arr. v.* 4. *p.* 771. *t.* 18. *f.* 1. *Turn. Musc. Hib. p.* 4. *Engl. Bot. t.* 330. *Schwaegr. Suppl. p.* 1. *t.* 1.

HAB. Moist banks.

When this plant grows, as is frequently the case, in company with *Weissia Starkeana*, they may easily be confounded with each other. The present is then best known by its nearly spherical fruit. The leaves too are much less recurved at their margins.

11. *P. curvicollum*; leaves narrow-ovate, acuminated; capsule globose; fruitstalk curved. (TAB. V.)

P. curvicollum. *Hedw. St. Cr. v.* 1. *t.* 11. *Engl. Bot. t.* 905.

HAB. Moist banks.

*P. curvicollum* may readily be distinguished from the preceding species by its more flexible, much longer, and more acuminated leaves. In both there is a decided columella.

## 4. GYMNOSTOMUM.

GEN. CHAR. *Fruitstalks* terminal; mouth of the *Capsule* naked; *Calyptra* dimidiate. (TAB. I.)

A delicate, horizontal, annular membrane may be seen to arise within the mouth of the capsule of some species, when examined in a fresh state, as in *G. microstomum*, *G. fasciculare*, *G. truncatulum*, and above all in *G. Griffithianum*, in which not unfrequently this membrane is entire. This circumstance allies the genus to *Leptostomum* of Brown, in which the annular membrane is of a firmer texture and erect; and this again except in being shorter comes very near the peristome of *Diphyscium*, whose capsules are in other respects not dissimilar. There is nothing in the habit of the species of this genus to distinguish them from the *Weissiæ*; and indeed in the species *G. microstomum* and *G. Heimii* there are so many points in common with *Weissia controversa* and *W. lanceolata*, that they can only be discriminated by an examination of the mouth of the capsule.

* *Stem elongated, branched.*

1. *G. lapponicum*; leaves lineari-lanceolate, crisped when dry; the perichætial ones broadly ovate, their margins involute; capsule turbinate, striated. (TAB. VI.)

G. lapponicum. *Hedw. St. Cr. v.* 3. *t.* 5. A. *Moug. et Nestl. n.* 309. *Engl. Bot. t.* 2216. Anictangium lapponicum. *Hedw. Sp.*—Bryum lapponicum. *Dicks.*

HAB. On rocks in alpine situations.

This species as well as *G. æstivum* and *G. viridissimum*, from their elongated stems and ramification, seem to belong to the genus *Anictangium*; besides, two out of the three have a remarkable form of their perichætia, and the leaves have a curiously dotted appearance when seen under a lens and a pellucid nerve. But the calyptra is dimidiate, and therefore brings these plants under our characters of *Gymnostomum*. The stems of the species here described are from one to two inches in length, the leaves dark green, and the capsule singularly deeply striated, or rather perhaps furrowed.

2. *G. æstivum*; leaves lanceolate, twisted when dry; the perichætial ones broadly ovate, their margins involute; capsule oblong, smooth. (TAB. VI.)

G. æstivum. *Hedw. Sp. Musc. t.* 2. *f.* 4-7. G. luteolum. *Engl. Bot. t.* 2201. (not of *Fl. Brit.* according to Mr. Davies's specimens.) G. tristichon. *Wahl. Lapp.* Anictangium compactum. *Schwaegr. Suppl. t.* 11.

HAB. On wet rocks.

The stems are from one to three inches in length, and very much tufted; the leaves short and rigid:—but we do not see that they are regularly trifarious in their insertion, as Wahlenberg states them to be.

3. *G. viridissimum*; leaves broadly lanceolate; capsule ovate; lid obliquely rostrate. (TAB. VI.)

G. viridissimum. *Engl. Bot. t.* 1583. (fig. bad.) Bryum viridissimum. *Dicks.* Dicranum viridissimum. *Smith Fl. Brit.—Turn. Musc. Hib. p.* 71. Grimmia? Forsteri. *Engl. Bot. t.* 2225. Bryum Forsteri. *Dicks.*

HAB. On trees.

In the circumstance of its growing upon trees this species is unlike the remaining British congeners. The stems are scarcely an inch in height. The leaves and indeed the whole habit of the plant greatly resemble the *Zygodon conoideum*; but our plant is much larger, and in every respect is so like our authentic specimens of *Grimmia? Forsteri*, Sm. that we have little hesitation in reducing this plant to *G. viridissimum*.

4. *G. curvirostrum*; leaves subulate; capsule turbinate, ovate; lid obliquely rostrate. (Tab. VI.)

G. curvirostrum. *Hedw. St. Cr. v.* 2. *t.* 24. *Engl. Bot. t.* 2214. Bryum æstivum. *Linn.* Bryum stelligerum. *Dicks.* Gymn. stelligerum. *Engl. Bot. t.* 2202. G. æruginosum. *Engl. Bot. t.* 2200. G. luteolum. *Smith Fl. Brit.* (not *Engl. Bot.*) G. rupestre. *Schwaegr. Suppl. t.* 11.

Hab. Moist rocks.

Stems from two to three inches in length. Under *G. curvirostrum* Sir James Smith, in *Fl. Brit.*, has given a description drawn from specimens so named by the Rev. H. Davies, which are nothing more than *G. luteolum*, Engl. Bot. (*G. æstivum*, Hedw.) But according to authentic specimens, those of *G. stelligerum* and *G. æruginosum* figured in *Engl. Bot.* are the true *G. curvirostrum.*

** *Stems short, simple.*

5. *G. Griffithianum*; leaves obovato-rotundate, reticulated, their nerve disappearing below the summit; fruitstalk carnose, thick; lid hemispherical. (Tab. VII.)

G. Griffithianum. *Smith Fl. Brit.—Engl. Bot. t.* 1938. Bryum Griffithianum. *Dicks. Crypt. fasc.* 4. *t.* 10. *f.* 10. Splachnum Griffithianum. *With. & Hull* (according to Smith).

Hab. Mountains in Wales, Yorkshire, and Scotland.

The stems, as in all the remaining species of this genus, never exceed half an inch in height. The membrane stretching across the mouth of the capsule, noticed under the observations to the Generic characters, is only to be seen in fresh specimens. The seeds are large. The habit is that of a *Splachnum*; the leaves very cellular; the fruitstalk remarkably succulent; the lid nearly flat; the calyptra is lanceolate, and from the few specimens we have examined appears to be dimidiate. Obovate bodies are imbedded at the base of some of the leaves in a clustered manner, as in many of the *Jungermanniæ*, and may be considered *gemmæ*. Sir James Smith has erred in saying that Mr. Hooker found this plant on Ben Lawers in Scotland. His specimens, which are those figured in *Engl. Botany*, were gathered by the Rev. Mr. Dalton and himself on Ingleborough, Yorkshire. The late Mr. Donn however, of Forfar, communicated specimens to Mr. Lyell from mountains in Angusshire.

6. *G. ovatum*; leaves ovate, erect, concave, piliferous, their nerve furnished with a granuliferous membrane; lid rostrate. (Tab. VII.)

*a. vulgare*; capsule ovate.

G. ovatum. *Hedwig. St. Cr. v.* 1. *t.* 6. *Turn. Musc. Hib. p.* 9. *Engl. Bot. t.* 1889 *Moug. et Nestl. n.* 308.

*β. gracile*; capsule oblong.

HAB. Banks and walls.

This is a species which varies much in the length of the fruitstalk, and also of its capsule; but it may always be known by the concave, obtuse, and piliferous leaves, and especially by their nerve, which in the upper part is furnished with one and sometimes two large oblong membranous appendages, to the surface of which are attached minute greenish bodies (*gemmæ?*). This peculiarity appears to have been noticed by no other muscologist but Hedwig, who has both described and figured them in his *Stirpes Crypt.*

7. *G. truncatulum*; leaves ovate, apiculate, patent, nearly plane; lid obliquely rostrate. (TAB. VII.)

G. truncatulum. *Hoffm. Germ. v.* 2. *p.* 27. *Turn. Musc. Hib. p.* 7. *Engl. Bot. t.* 1975. G. truncatum. *Hedw. St. Cr. v.* 1. *t.* 5. *Moug. et Nestl. n.* 114. Bryum truncatulum. *Linn.* G. intermedium. *Turn. Musc. Hib. p.* 7. *t.* 1. *f. a. Engl. Bot. t.* 1976.

HAB. On banks and walls.

The British *G. intermedium* differs from *G. truncatulum* only in the longer and more ovate form of the capsule, which is turbinate in the latter.

8. *G. Heimii*; leaves lanceolate, serrated at the point; capsule ovato-oblong; lid obliquely rostrate. (TAB. VII.)

G. Heimii. *Hedw. St. Cr. v.* 1. *t.* 30. *Turn. Musc. Hib. p.* 9. *Engl. Bot. t.* 1951. G. obtusum. *Hedw. Sp. Musc. t.* 2. *f.* 1-3. *Turn. Musc. Hib. p.* 9. *Engl. Bot. t.* 1407.

HAB. On moist banks.

The *Gymnostomum obtusum* is not that we can find at all different from *G. Heimii*, which, being the older name, we retain.

9. *G. conicum*; leaves oblongo-obovate, apiculate; capsule ovate; lid conical, obtuse. (TAB. VII.)

G. conicum. *Schwaegr. Suppl. t.* 9.

HAB. Fields near Cork.

Mr. Drummond only has found this plant near Cork. It is scarcely to be distinguished from *Weissia Starkeana* but by the absence of the peristome. The shape of the lid is very different from that of *G. truncatulum*, than which it is likewise much smaller.

10. *G. fasciculare*; leaves oblongo-acuminate, nearly plane, sub-serrated, marginated; capsule pyriform; lid plane, sub-mammillate. (TAB. VIII.)

G. fasciculare. *Hedw. Sp. Musc. t.* 4. *f.* 5-9. (bad.) *Turn. Musc. Hib. t.* 10. *Engl. Bot. t.* 1245. *Sturm. Deutsch. Fl.*

HAB. Moist banks.

11. *G. pyriforme*; leaves ovato-acuminate, concave, serrated, not marginated; capsule roundish obovate; lid convex, shortly rostrate. (TAB. VII.)

G. pyriforme. *Hedw. Sp. Musc. p.* 38. *Sturm. Deutsch. Fl. Turn. Musc. Hib. p.* 11. *Engl. Bot. t.* 413. *Moug. et Nestl. n.* 13.—*Dill. Musc. t.* 44. *f.* 6.

HAB. Wet banks and sides of ditches abundant.

We trust that the characters here given will be sufficient to distinguish this and the preceding species.

12. *G. tenue*; stem scarcely any; outer leaves very short, ovato-lanceolate; inner ones lineari-lanceolate, all of them erect, obtuse, with a strong nerve disappearing below the summit; capsule oblong. (TAB. VII.)

G. tenue. *Hedw. Sp. Musc. t.* 4. *f.* 1-4. G. paucifolium. *Engl. Bot. t.* 2506. Dicranum cylindricum. *Smith Fl. Brit.* Bryum paucifolium. *Dicks. Crypt. fasc.* 4. *t.* 11. *f.* 3.

HAB. On sandstone rocks.

This plant is remarkable for having two kinds of leaves, of which the outer and lower ones are much the shortest, and broadly lanceolate, whilst the inner and uppermost are lineari-lanceolate; both kinds are nearly plane, very obtuse at the point. The capsule is cylindrical.

13. *G. Donnianum*; stem very short; leaves subulate, straight; capsule turbinate. (TAB. VII.)

G. Donnianum. *Engl. Bot. t.* 1582.

HAB. On a rock in the den of Dupplin, Perthshire. Mr. G. Donn.

This curious little plant comes nearer in habit to *Weissia calcarea* than to any other moss with which we are acquainted.

14. *G. microstomum*; leaves broadly subulate, their margin involute above, flexuose, crisped when dry; capsule elliptical, contracted at the mouth; lid subulate, incurved. (TAB. VII.)

G. microstomum. *Hedw. St. Cr. v.* 3. *t.* 30. *Engl. Bot. t.* 2215. G. rutilans. *Hedw. Sp. Musc. t.* 3. *f.* 8-11. G. tortile. *Schwaegr. Suppl. t.* 10?

HAB. Banks.

In general habit this species is most closely allied to *Weissia controversa*; so that it is probably only with certainty to be distinguished from it by an examination of the mouth of the capsule. This is furnished with a delicate

irregularly terminating membrane, is perfectly destitute of teeth, and much contracted; the fruitstalk too is short in proportion to the leaves.

## 5. ANICTANGIUM.

GEN. CHAR. *Fruitstalks* terminal; mouth of the *Capsule* naked; *Calyptra* mitriform. (TAB. I.)

Of this genus the only two species (if they be really distinct) have their leaves destitute of a nerve.

We think the genus *Anictangium* may well be confined to those species which have a terminal fructification and a mitriform calyptra; while *Hedwigia* should be appropriated to those which have their fruit lateral.

1. *A. ciliatum*; leaves ovate, much lengthened out and diaphanous at the points; those of the perichætium laciniated at their extremity. (TAB. VI.)

   A. ciliatum. *Hedw. Sp. Musc. p.* 40. *Turn. Musc. Hib. p.* 11. Hedwigia ciliata. *Hedw. St. Cr. v.* 1. *t.* 40. Gymnostomum ciliatum. *Engl. Bot. t.* 1179. Gymnostomum Hedwigia. *Moug. et Nestl. n.* 12. Bryum ciliatum. *Dicks.* Bryum apocarpum β. *Linn.—Dill. Musc. t.* 32. *f.* 5.

   HAB. Rocks in subalpine countries.

2. *A. imberbe*; leaves ovato-acuminate, coloured at the points; those of the perichætium serrated at the extremity. (TAB. VI.)

   Gymnostomum imberbe. *Engl. Bot. t.* 2237. Hedwigia integrifolia. *P. de Beauv. Prodr. p.* 60.

   HAB. Irish mountains.

   We fear that future observations will induce botanists to unite the two plants now described, their only difference being in the points of the leaves, but especially in the perichætial ones.

## 6. SCHISTOSTEGA.

GEN. CHAR. *Fruitstalks* terminal; mouth of the *Capsule* naked; *Lid* laciniated; *Laciniæ* deciduous. (TAB. I.)

We have never been so fortunate as to gather fresh specimens

of this curious genus; and it is only upon the plants preserved in our Herbaria and those of our friends that we have been able to make our observations. The result of these has been by no means satisfactory in enabling us to verify those of Hedwig and Mohr relative to the splitting of the lid into segments. Our drawing of this character is consequently taken from Hedwig's figure; and we willingly adopt the genus on account of its very peculiar habit, which at first sight approaches near to that of some of the distichous-leaved *Dicrana*; and it is not improbable that, mistaken for some of the small varieties of *Dicranum bryoides*, it has been so seldom collected in Britain.

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1. *S. pennata.* (Tab. VIII.)

Schistostega osmundacea. *Mohr Fl. Crypt. Germ. p.* 92. Gymnostomum pennatum. *Hedw. St. Cr. v.* 1. *t.* 29. *Engl. Bot. t.* 2213. Mnium osmundaceum. *Dicks. Pl. Crypt. fasc.* 1. *t.* 1. *f.* 4.

Hab. Banks.

The only known station in Britain for this singular and very minute moss is in the road from Zele to South Tawton Church, near Okehampton, Devonshire, where it was found by Mr. Newberry. The stems are scarcely a quarter of an inch in height, and in all the specimens that we have seen simple; on the lower half bare of leaves, the upper furnished with them of a lanceolate figure, much reticulated, plane and disposed in a pinnated manner. They are decurrent at the base, but by no means confluent: those in the centre are the longest, and they gradually diminish in size above and below. The fructification is terminal, the fruitstalk nearly equal in length to the stem, in our specimens. The capsule spherical. The lid and calyptra we have not seen.

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## 7. DIPHYSCIUM.

Gen. Char. *Fruitstalks* terminal; *Capsule* gibbous; *Peristome* single, forming a plicate, membranous, truncated cone; *Calyptra* mitriform. (Tab. I.)

We must confess ourselves unable to detect any thing that can be considered a second peristome, and are therefore obliged,

though very reluctantly, to remove it from *Buxbaumia* as a genus, and consequently to a different part of the order in an artificial system.

1. *D. foliosum.* (Tab. VIII.)

D. foliosum. *Mohr Obs. Bot. p.* 34. *Hook. in Fl. Lond. with a figure. Moug. et Nestl. n.* 37. Buxbaumia foliosa. *Linn. Syst. Veg. p.* 945. *Hedw.—Engl. Bot. t.* 329. *Turn. Musc. Hib. p.* 104. Buxbaumia sessilis. *Schmid.*—Phascum montanum. *Huds.*—P. maximum. *Lightf.—Dill. Musc. t.* 32. *f.* 13.

Hab. In woods and on rocks in alpine situations.

The stems are exceedingly short, and grow in densely-matted patches. The leaves small, ligulate, of a dark green colour, furnished with a strong nerve. The perichætial leaves large, erect, membranous, pale brown, covering entirely the capsule, lanceolato-oblong, acuminated, and towards the extremity cut in a singular manner into long slender segments at the margin; nerve strong, rigid, brown, very excurrent, serrulate at the extremity. Capsule large, ovate, gibbous, oblique. Calyptra mitriform. Lid conical, acuminated. Peristome simple, consisting of a plicate membrane forming a cone.

## 8. TETRAPHIS.

Gen. Char. *Fruitstalks* terminal; *Peristome* single, consisting of four equidistant upright teeth; *Calyptra* mitriform. (Tab. I.)

The lid in the only two known species of this genus is remarkably thin and scariose in texture, and the teeth are reticulated, not striated as in most mosses. The calyptra is striated, or furrowed; the leaves are rigid.

1. *T. pellucida*; stems elongated, leaves ovato-acuminate, those of the perichætium lanceolate; capsule cylindrical. (Tab. VIII.)

T. pellucida. *Hedw. Sp. Musc. t.* 7. *f.* 1. *Engl. Bot. t.* 1020. *Turn. Musc. Hib. p.* 12. *Moug. et Nestl. n.* 14. Mnium pellucidum. *Linn.—Dill. Musc. t.* 31. *f.* 2.

Hab. Generally found on decaying trunks of trees; sometimes on the ground, and most abundant in mountainous countries.

This plant has a peculiar character which distinguishes it from every other known moss. The leaves are of a pale and pleasant green colour, rigid, furnished with a nerve which terminates below the point; those surrounding the perichætium are much longer and narrower than the rest. Capsule oblong, cylindrical: teeth large, brown: calyptra much resembling that of an *Orthotrichum*, but smooth. Besides the plants which bear the male and female fructification (usually so called) there are others which are terminated by cup-shaped receptacles, consisting of broadly obcordate leaves, in the centre of which are fixed by a short footstalk small spherical bodies, bearing an exact analogy to the anthers of *Jungermanniæ*.

2. *T. ovata*; stems very short; leaves few, linear, slightly incrassated upwards, those of the perichætium ovate, obtuse; capsule ovate. (Tab. VIII.)

T. ovata. *Hoppe in Deutschl. Fl.* (with a figure.) *Schwaegr. Suppl. t.* 13. Bryum Brownianum. *Dicks. Crypt. fasc.* 4. *t.* 10. *f.* 16. Orthotrichum Brownianum. *Smith Fl. Brit.*—Grimmia Browniana. *Engl. Bot. t.* 1422.

Hab. Rocks, particularly of granite, in the north of England and Ireland.

Although possessing the true generic character of a *Tetraphis*, the general aspect of the plant and the form and structure of the leaves are totally different. In size, the whole plant rarely exceeds half an inch. Stems scarcely any. Outer leaves very few, half as long as the fruitstalk, linear or only a little swollen upwards, thick, rigid, dotted. Inner or perichætial leaves broad, ovate, concave, rigid, with a faint nerve at the base. All of them of an olive-green colour inclining to brown. Capsule ovate, reticulated, dark brown. Lid conico-acuminate, a little oblique. Hoppe, we believe, first discovered this plant, and described it as a *Tetraphis:* but he has omitted to figure the outer leaves, as has Schwaegrichen; nor has Bridel described them. Sir James Smith, misled by the appearance of the calyptra, placed it among the *Orthotricha* and afterwards with the *Grimmiæ*, and in *English Botany* is a most incorrect figure of the peristome with 8 double teeth, or 16 placed closely in pairs

## 9. SPLACHNUM.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of eight double teeth; *Capsule* with an evident apophysis; *Calyptra* mitriform, without furrows. (TAB. I.)

Although in characters it may be difficult to distinguish this genus from *Orthotrichum*, since there is scarcely one of those above mentioned but what may be found in a greater or less degree to apply to some species of the latter genus; yet, in general habit, as well as in their places of growth, they are abundantly distinct. The calyptra, which Mohr denominates mitriform, approaches in this genus near to that termed dimidiate; it is however totally different from that of *Orthotrichum*, which, besides that from its greater size it may be found remaining on the fully formed capsule, is moreover deeply furrowed, and we may add in almost every instance beset with short hair-like bodies. *Gymnostomum Griffithianum* and *Weissia splachnoides* have a great resemblance to this genus; but in the former the mouth of the capsule is naked, in the latter the 16 teeth are equidistant.

The lid, as Wahlenberg justly observes, is short and obtuse; in which respect *Splachnum* differs from the *Tayloria* of Hooker in the 3d Number of the *Journal of Science and the Arts*, (*Hookeria* of Schwaegr.) as well as in the number and curious configuration of the teeth of the latter. The annual species of *Splachnum* are usually found growing on dung, while the perennial ones are found on more permanent situations. They are all alpine plants except *S. ampullaceum*, which often grows in bogs nearly on a level with the sea. The fructification is rendered more striking from the bright colours of the apophysis, being in the last-mentioned species of a pinky hue.

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### * *Leaves acuminate.*

1. *Splachnum sphæricum*; leaves obovato-rotundate, acuminate, slightly serrated; apophysis ovato-globose, wider than the capsule. (TAB. IX.)

S. sphæricum. *Linn. Fil. Meth. Musc. t.* 1. *f.* 1. *Hedw. St. Cr. v.* 2. *t.* 16. *Engl. Bot. t.* 785. S. gracile. *Dicks. Pl. Crypt. fasc.* 4. *t.* 10. *f.* 5. *Engl. Bot. t.* 1921. *Schwaegr. Suppl. t.* 15. S. ovatum. *Hedw. Sp.*

*Musc. p.* 54. *t.* 8. *f.* 4-6. *Turn. Musc. Hib. p.* 15. *Engl. Bot. t.* 1590. S. rugosum. *Dicks. Pl. Crypt. fasc.* 4. *t.* 10. *f.* 7. *Engl. Bot. t.* 2094.

HAB. Found on the dung of various animals in alpine countries.

This is the most common species of the genus, and liable to variation in the length of the stems, which are from a quarter of an inch to an inch in height, and of the fruitstalks, which are often flexuose. In addition to *S. gracile*, which Turner and following him Mohr have already justly united to *S. sphæricum*, we have to add, as Mr. Turner suspected, on the authority of specimens sent from Mr. Dickson, his own *S. rugosum*. The specimens figured in *English Botany* under this name have the appearance of *S. vasculosum*, but the leaves are acuminate, which is not the case in this plant. Schwaegrichen, who contends that *S. gracile* is specifically distinct from *sphæricum*, does so principally on the ground that the leaves of one are serrated and those of the other entire, which does not hold good, as far as our experience will enable us to decide; and we equally think his other characters are not to be relied on; as for instance what he introduces into the specific character, of the apophysis of *S. sphæricum* being green, for so it is in every *Splachnum* when young, changing as they advance; when *S. sphæricum* becomes dark brown with a yellow capsule.

2. *S. tenue*; leaves obovato-acuminate, serrated; apophysis obconical, narrower than the capsule; columella exserted. (TAB. IX.)

S. tenue. *Dicks. Crypt. fasc.* 2. *t.* 4. *f.* 2. *Engl. Bot. t.* 1133. S. serratum. *Hedw. Sp. Musc. t.* 8. *f.* 1-3. S. longicollum. *Dicks. Crypt. fasc.* 4. *t.* 10. Grimmia splachnoides. *Smith Fl. Brit.* (not of *Engl. Bot.*? nor of *Swartz.*)

HAB. Scotch mountains in very elevated situations upon the ground, in a turfy soil, never on the dung of animals.

The description of *Grimmia splachnoides* in *Fl. Brit.* is taken from specimens (which we have examined) of this plant: it is consequently very different from *Weissia splachnoides* of Swartz. The stems are short in this species, rarely exceeding half an inch in height; the fruitstalks about an inch long. We should have no hesitation in considering the figure of *Grimmia splachnoides* in *Engl. Bot.* as different from our plant, were it not that the leaves are represented as acuminate and serrate, which is by no means the case with *Weissia splachnoides* of Swartz.

3. *S. mnioides*; leaves ovato-lanceolate, much acuminated, concave, entire; apophysis obovate, nearly as narrow as the capsule. (Tab. IX.)

*α. minus*, of a deeper colour and with shorter stems.

S. mnioides. *Linn. Fil. Meth. Musc. p.* 6. *Hedw. St. Cr. v.* 2. *t.* 11. *Engl. Bot. t.* 1539. S. urceolatum *β. Wahl. Fl. Lapp.* S. urceolatum. *Dicks. Crypt. fasc.* 2. *p.* 2. (according to authentic specimens, as well as the figure in *Engl. Bot.*, not of *Hedw.*)

*β. majus*, of a paler colour and with elongated stems.

S. fastigiatum. *Dicks. Crypt. fasc.* 3. *p.* 2. *Engl. Bot. t.* 786. S. Brewerianum. *Hedw. St. Cr. v.* 2. *t.* 38.—*Dill. Musc. t.* 44. *f.* 5.

Hab. Upon the lofty mountains of England, Scotland, and Ireland, generally growing among mosses in rocky situations. Mr. Griffiths alone, in Withering, says he found his *S. purpureum* (decidedly our *mnioides*) on cow-dung; but his specimens in Mr. Turner's herbarium intermixed with *Hypnum cupressiforme* prove tolerably satisfactorily that such could not have been their place of growth.

Besides the characters above allotted to the varieties, we can discover no point of distinction between them. The true *S. urceolatum*, a plant of more northern regions, differs by its shorter, very concave, and obtuse leaves, which are moreover hair-pointed; and whether a distinct species or not, as Wahlenberg supposes, it has not yet been met with in Britain. *S. purpureum* of Withering, according to Mr. Griffiths' own specimens, belongs to this species, and not to *S. tenue* as Sir James Smith says it does. Our *var. α.* rarely exceeds an inch in height; *β.* attains the length of four or even five inches, and has the fruitstalks, which in both are about half an inch long, of a bright and shining orange colour.

4. *S. angustatum*; leaves ovato-lanceolate, much acuminated, serrated; apophysis obovate, somewhat narrower than the capsule; fruitstalks scarcely longer than the leaves. (Tab. IX.)

S. angustatum. *Linn. Fil. Meth. Musc. p.* 33. *Hedw. St. Cr. v.* 2. *t.* 12. *Engl. Bot. t.* 1132.

Hab. On cow-dung by Lochawen, *Mr. Dickson*. Scotch mountains, *Mr. Mackay*. Cairngorum, in the Scottish Highlands, growing on the turfy soil.

This, which approaches the preceding so nearly in the shape of the leaves, has them however serrated; and the fruitstalks are much shorter than in any variety of that species. The stems vary from half an inch to two or three inches in length.

5. *S. ampullaceum*; leaves ovato-lanceolate, acuminate, serrated;

apophysis inversely flagon-shaped, twice as wide as the capsule. (Tab. IX.)

S. ampullaceum. *Linn. Sp. Pl. p.* 1572. *Hedw. St. Cr. v.* 2. *t.* 14. *Turn. Musc. Hib. p.* 16. *Engl. Bot. t.* 144. *Moug. et Nestl. n.* 15. S. Turnerianum. *Dicks. Crypt. fasc.* 4. *t.* 10. *f.* 11. *Engl. Bot. t.* 1116.

Hab. Bogs in various parts of England, Scotland, and Ireland; growing upon the ground as well as on the dung of animals, and on the plains as well as the mountains.

We agree entirely with Mr. Turner that Mr. Dickson's *S. Turnerianum* is a variety depending on age and particular circumstances of season and accident. The whole plant is smaller, and the apophysis of the capsule narrower than in the common appearance. In both the stems are short, often scarcely any, the fruitstalks two and even three inches in length.

** *Leaves obtuse.*

6. *S. vasculosum*; leaves rhombo-rotundate, obtuse, the nerve disappearing before the point; apophysis globose, much wider than the capsule. (Suppl. Tab. I.)

S. vasculosum. *Hedw. St. Cr. v.* 2. *t.* 15. S. rugosum. *Engl. Bot. t.* 2094.? (not of Dickson.)

Hab. Scotland. Sent thence by the late *Mr. Don* to *Mr. Dickson*, without any further particulars as to the place of its growth. Bog half-way up Ben Lawers. *Mr. J. T. Mackay.*

The stems are half an inch or more in length; the fruitstalks about twice as long. Contrary to Mohr's observation, we find the nerve of the leaf, as figured by Hedwig, constantly disappearing before the point. We have previously observed the figure of the natural size in *English Botany* to resemble a good deal our plant: but then the magnified leaf which is so acuminated can never have been taken from our specimens, for which we are lately indebted to Mr. Dickson, who had received them from Mr. G. Don. Others found by Mr. J. T. Mackay in the year 1803 in a bog half-way up Ben Lawers exist in Mr. Turner's herbarium. Wahlenberg relates of this plant (what our own observations will by no means confirm), that he has seen some states of it with the capsules so dilated and the leaves so lengthened that they could be with difficulty distinguished from *S. ampullaceum.* Our own specimens appear very distinct.

7. *S. Frœlichianum*; leaves ovate, rounded at the points, their nerve disappearing before the summit; apophysis obovate, much narrower than the capsule. (Tab. IX.)

S. Frœlichianum. *Hedw. St. Cr. v.* 3. *t.* 40. Bryum reticulatum. *Dicks. Crypt. fasc.* 2. *t.* 4. *f.* 6. S. reticulatum. *Engl. Bot. t.* 2507.

Hab. On Ben High in the Scottish Highlands, *Mr. Dickson.* Very rare.

The figure and description in *English Botany* represent the leaf of this plant acute, contrary to our observations upon Mr. Dickson's specimens. *Weissia splachnoides* and *Gymnostomum Griffithianum*, which have the habit of a Splachnum, and from their obtuse leaves might by a casual observer be mistaken for this species, differ; the former in the greater length of the fruitstalks and ligulate leaves, and the latter in the much broader, obovato-rotundate leaves, in the want of a real apophysis, and in the thickened fruitstalk,—to say nothing of the characters of the respective genera.

In *S. Frœlichianum* the stems scarcely ever exceed half an inch in length, and the fruitstalks are about twice as long.

## 10. CONOSTOMUM.

Gen. Char. *Fruitstalks* terminal; *Peristome* single, of 16 equidistant teeth, all united at their summits; *Calyptra* dimidiate. (Tab. I.)

This curious genus, which was first established by Swartz in Schrader's Journal, approaches in habit, as Wahlenberg justly observes, to *Bartramia fontana*; and the exotic species named *C. australe* by Swartz has actually been described by Bridel under the name of *Bartramia pentasticha.*

1. *C. boreale*; stems rather short; leaves lanceolate, acuminated, carinated, slightly toothed. (Tab. X.)

C. boreale. *Swartz in Schrad. Journ. Bot. v.* 1. *p.* 24. *t.* 5. Grimmia conostoma. *Engl. Bot. t.* 1135. Bryum tetragonum. *Dicks. Crypt. fasc.* 2. *p.* 8. *t.* 4. *f.* 9.

Hab. The summits of the highest of the Scottish mountains, especially in the Breadalbane district.

The leaves do not appear to us by any means to give the stems a regularly tetragonous appearance, as Dickson's name implies, nor to be quinquefarious, according to Sir James

Smith's remark. Sometimes in dried specimens the imbrication of the carinated leaves makes the stems appear angular; but when moist they are nearly cylindrical. The capsules and indeed the whole plant bear no very slight resemblance to small specimens of *Bartramia fontana*. The operculum, however, is conico-subulate.

It is quite an alpine plant, and in Switzerland we have not met with it at a less elevation than 7 or 8000 feet.

## 11. POLYTRICHUM.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 32 or 64 equidistant incurved teeth; their summits united by a horizontal membrane; *Calyptra* dimidiate, small. (TAB. I.)

The teeth in this genus are short, incurved, obtuse, between membranaceous and cartilaginous, their margins whitish, semipellucid, their centres marked with a red longitudinal line; the membrane which unites them, under a high power of the microscope appears perforated.

The following extract from Wahlenberg will justify us in rejecting the division of this tribe into *Polytrichum* and *Catharinea*, as adopted by Ehrhart and Mohr. "In hoc et plerisque Polytrichis pili calyptræ tum in apice ipsius calyptræ tum in vaginula inseruntur. Flos fœmineus calyptræ summitatem et vaginulam continuas habet, utrasque filis succosis erectis cohærentibus vestitas. Post florescentiam in altum surgit summitas calyptræ, et inferior pars elongatur simulque glabra fit, dum pili vaginulæ cum calyptræ pilis cohærentes elongantur demumque ab insertione evellentur. Hinc quasi deorsum reflexi apparent pili; quod tamen neutiquam sunt, dum antea inferne in vaginula inserti fuerunt. De cætero pilositas calyptræ in diversis diversa: in *P. hercynico* per totam calyptram sparsa, apud *P. undulatum* in apice tantum, et apud *P. lævigatum* omnino deest."

### * *Calyptra naked.*

1. *P. undulatum*; leaves lanceolate, undulate, their margins

plane, denticulated, their nerve winged; capsule cylindrical, curved; lid subulate. (TAB. X.)

P. undulatum. *Hedw. St. Cr. v.* 1. *t.* 16-17. *Turner Musc. Hib. p.* 91. *Engl. Bot. t.* 1220. Catharinea Callibryon. *Ehrh.*—Catharinea undulata. *Web. et Mohr.—Moug. et Nestl. n.* 131. Bryum undulatum. *Linn.—Dill. Musc. t.* 46. *f.* 18.

HAB. Common on moist shady banks and in woods.

Stems from one to two inches high, leaves of a thin and delicate structure, (unlike those of the rest of the genus,) crisped when dry. A very remarkable variety of this plant has been found by Mr. Templeton in the Dargle near Dublin, with fruitstalks scarcely two lines in length, and the back of the leaf furnished with evident denticulations, which latter circumstance is not confined to this variety and has been noticed by Bridel. The winged nerve we do not remember to have been previously noticed,—it is a narrow foliaceous appendage running along each side of the nerve. Something of this kind may indeed be observed on the nerves of almost all the *Polytricha* (as may be seen by our figures); that is to say, they are furnished in a more or less obvious degree with lamellæ, which in *Polytrichum lævigatum* of Wahlenberg are so prominent as almost to resemble the leaves of a book: in the following species, *P. hercynicum*, they are less apparent, and in most of the larger species give the nerve a striated appearance.

2. *P. hercynicum*; leaves lanceolate, rigid, entire, their sides involute; their nerve broad, impressed with furrows; capsule oblong, sub-erect; lid conical. (TAB. X.)

P. hercynicum. *Hedw. St. Cr. v.* 1. *t.* 15. *Engl. Bot. t.* 1209. Catharinea hercynica. *Ehrh.—Mohr.*—Bryum incurvum. *Huds.*

HAB. On mountains at a considerable elevation.

Stems short. Leaves as it were intermediate in texture between those of *P. undulatum* and the rest of the *Polytricha*.

** *Calyptra covered with succulent filaments.*

† *Leaves entire; their margins involute.*

3. *P. piliferum*; leaves lanceolato-subulate, their margins involute, entire, terminating in a pellucid hair-like point; capsule ovate, obtusely quadrangular, furnished with an apophysis; lid conical. (TAB. X.)

P. piliferum. *Schreb. Fl. Lips. p.* 74. *Menzies in Linn. Trans.—Turn. Musc. Hib. p.* 82. *Engl. Bot. t.* 1199. *Moug. et Nestl. n.* 128.—*Dill. Musc. t.* 54. *f.* 3.

HAB. On heaths.

Stems short, destitute of leaves at the base.

4. *P. juniperinum*; leaves lanceolato-subulate, their margins involute, entire, their points acuminated, coloured, subserrated; capsule ovate, obtusely quadrangular, furnished with an apophysis; lid conical. (TAB. X.)

P. juniperinum. *Wild. Fl. Berol.—Hedw. Sp. Musc. t.* 18. *Turn. Musc. Hib. p.* 82. *Engl. Bot. t.* 1200. *Menzies in Linn. Trans. v.* 4. *t.* 6. *f.* 4. P. juniperifolium. *Hoffm.—Mohr.—Moug. et Nestl. n.* 417. P. strictum. *Menzies in Linn. Trans. v.* 4. *t.* 7. *f.* 1. *Turn. Musc. Hib. p.* 83. *Engl. Bot. t.* 2435. P. alpestre. *Hoppe.—Schwaegr. Suppl. t.* 97.

HAB. On heaths.

We can perceive no other difference between the *P. strictum* and *P. juniperinum* than that the former is branched, while the stems of the latter are undivided; and we therefore cordially assent to the opinion of Mr. Turner in considering them as the same species. Following Mohr also, we have united to our plant the *P. alpestre* of Hoppe and Schwaegrichen. We must here also declare that, except in the want of the hair-points to the leaves, and their being more scabrous at the extremity, we can find no essential difference between this and the preceding species.

5. *P. septentrionale*; leaves lineari-subulate, obtuse, their margins, especially towards the top, involute, subserrulate; capsule ovate, subangulate, furnished with a minute apophysis; lid conical, acuminate. (TAB. X.)

P. septentrionale. *Swartz Musc. Suec. t.* 9. *f.* 18. *Menzies in Linn. Trans. v.* 4. *t.* 7. *f.* 5. P. sexangulare. *Hoppe.—Engl. Bot. t.* 1906. P. norvegicum. *Hedw. Sp. Musc. t.* 22. P. crassisetum. *De Cand. Fl. Fr.*

HAB. Highest summit of Ben Nevis, Scotland.

This species has been found in Britain only upon the highest summit of Ben Nevis, in 1808, by Messrs. Turner and Hooker. Although occurring there in tolerable plenty, yet it produced not a single capsule. On the loftiest summits of the Swiss Alps it is far from uncommon, and fructifies whilst covered with snow, where scarcely any perfect plant will vegetate. It is a species remarkable in the form of its leaves, which are very obtuse, curled when dry, so convex behind as to be semicylindrical, having their margins, especially at the tops, involute, and there alone slightly serrated. The fruitstalks too are of a succulent, by no means rigid, texture, and much thickened; whence the expressive name appropriated to it by De Candolle, and which we

should have gladly adopted were there not a prior claim to that of *P. septentrionale*. We are surprised that Mohr should say of *P. sexangulare*, "optimi juris species, facile dignoscenda," since it so precisely agrees with specimens that we have received from Swartz himself. We must however declare, that neither the figures of Swartz nor of Menzies give a just idea of the leaves.

†† *Leaves serrated, their margins plane.*

6. *P. commune*; stems elongated; leavespatent, lineari-subulate, their margins plane, serrated as well as the points of the keels; capsule erect, ovate, quadrangular with an evident apophysis. (Tab. X.)

*α. yuccæfolium*; stems a span and more in height; leaves with their margins of the same colour; capsule acutely quadrangular, its apophysis very distinct.

P. commune. *Linn. Sp. Pl. p.* 1573. *Hedw. Sp. Musc.—Menzies in Linn. Trans.—Turn. Musc. Hib. p.* 80. *Engl. Bot. t.* 1197. P. yuccæfolium. *Ehrh.—Mohr.—Moug. et Nestl. n.* 415.—*Dill. Muse. t.* 54. *f.* 1.

*β. attenuatum*; stems three or four inches in height; leaves shorter, their margins pellucid; capsule obtusely quadrangular; apophysis indistinct.

P. attenuatum. *Menzies in Linn. Trans. v.* 4. *t.* 6. *f.* 2. *Turn. Musc. Hib. p.* 84. *Engl. Bot. t.* 1198. P. formosum. *Hedw. Sp. Musc. t.* 19. *f.* 1. *Mohr.—Wahl.—Moug. et Nestl. n.* 416. P. gracile. *Menzies in Linn. Trans. v.* 4. *t.* 6. *f.* 3. *Turn. Musc. Hib. p.* 85. *Engl. Bot. t.* 1827. *Mohr.* P. longisetum. *Swartz Musc. Suec. t.* 8. *f.* 16. P. aurantiacum. *Hoppe.—Wahl.*

Hab. Heaths, in dry and wet places, varying much in height according to situation.

After an attentive examination of the above synonyms and specimens, received in most instances from their respective authors, we cannot but consider them all to belong to the same species; and indeed that as varieties there are only two worthy of particular attention. In all, the stems are simple, or only branched very low down and among the roots. Our var. *α.* is found from a span to a foot in height, with the leaves very patent, often recurved, long and narrow, their margins scarcely at all diaphanous; the capsule is sharply quadrangular, the apophysis very distinct. In *β.* the stems do not often exceed three or four inches; the leaves are rather less patent than in *α.*, and of a shorter and broader figure, with their margins whitish and diaphanous; the capsule is obsoletely quadrangular, and the apophysis indistinct. In both, the leaves are equally decidedly serrated.

With regard to the *P. gracile*, Mr. Menzies was inclined

at first to consider it only a variety of *P. attenuatum*, and we must confess that we can ourselves see no difference whatever. Of this latter, which Mohr takes up from Hedwig under the name of *formosum*, he says in his German Cryptogamic Flora, "obsoleta et adnata nec distante apophysi a præcedente (*P. communi*) statim dignoscenda et bona omnino species," although his only character by which it may be distinguished from the *formosum* is, that the capsule is obsoletely sexangular, a peculiarity which we cannot find to exist in any of our specimens. Wahlenberg on the other hand seems to be of opinion that it is only a slender variety of *P. attenuatum*; and he founds the chief distinction of the latter from *P. commune* in the diaphanous margin to the leaves.

7. *P. alpinum*; stems elongated, branched; leaves patent, subulato-lanceolate, the margins plane, serrated as well as the points of the keels; capsule sub-ovate, with an indistinct apophysis. (Tab. XI.)

P. alpinum. *Linn. Sp. Pl. p.* 1593. *Menzies in Linn. Trans.—Hedw. Sp. Musc. t.* 19. *Turn. Musc. Hib. p.* 85. *Engl. Bot. t.* 1905. *Moug. et Nestl. n.* 209. P. sylvaticum. *Menz. in Linn. Trans. v.* 4. *t.* 7. *f.* 6. P. arcticum. *Swartz Musc. Suec. t.* 8. *f.* 17.—*Mohr.*

Hab. In sub-alpine regions in England, Scotland, and Ireland.

The narrow leaves will distinguish this species from *P. urnigerum*, as the branched and somewhat fastigiate stems will from *P. commune* and its varieties. The stems are from three to four inches in height, the capsule is exceedingly variable in form. In *English Botany* it is represented as quadrangular, but far more decidedly so than ever we have seen it; not unfrequently it is ovate without any angles: we have some specimens gathered on the highest summit of Ben Nevis, in which it is almost exactly spherical; and Wahlenberg has met with specimens having capsules so cylindrical that he mistook them for plants of *P. urnigerum*. The apophysis is very indistinct, sometimes obsolete.

8. *P. urnigerum*; stems elongated, branched; leaves erecto-patent, lanceolate, acute, their margins plane, serrated; capsule erect, cylindrical, destitute of an apophysis. (Tab. XI.)

P. urnigerum. *Menzies in Linn. Trans.—Turn. Musc. Hib. p.* 86. *Engl. Bot. t.* 1218. *Moug. et Nestl. n.* 28.—*Dill. Musc. t.* 55. *f.* 5.

Hab. On banks and sides of streams, principally in mountainous countries. Mr. Turner has found it on banks at Gillingham, Norfolk.

This species has much the appearance of the following in the shape of the capsules, but in its leaves approaches nearer to the two preceding ones. The leaves, however, are very much more acute, broader, very strongly toothed, and of a singularly glaucous green hue, reddish only through age, by which it may be distinguished at first sight. The stems are still more branched than in *P. alpinum*, and about two or even three inches in length.

9. *P. aloides*; stems short; leaves linear-lanceolate, obtuse, their margins plane, serrated, principally at the extremity and at the summit of the keels: capsule nearly erect, cylindrical, without an apophysis. (Tab. XI.)

α. *major*: fruitstalks two inches long; stems usually simple.

P. aloides. *Hedw. St. Cr. v.* 1. *t.* 14. *Menz. in Linn. Trans.—Turn. Musc. Hib. p.* 88. *Engl. Bot. t.* 1649. *Moug. et Nestl. p.* 129. P. rubellum. *Menz. in Linn. Trans. v.* 4. *t.* 7. *f.* 3. *Turn. Musc. Hib. p.* 87. *Engl. Bot. t.* 1939. Mnium polytrichoides β. *Linn. Sp. Pl. p.* 1577.

β. *Dicksoni*: fruitstalks very short: stems branched with innovations.

P. Dicksoni. *Turn. Musc. Hib. p.* 90. *t.* 10. *f.* 2. *Engl. Bot. t.* 1605.

Hab. Moist banks, not uncommon.

Stems for the most part half an inch high and simple; in the *P. rubellum* of Menzies sometimes an inch in length, and producing here and there innovations which make them appear branched. The var. β. has the stems always branched with one or more annotinous shoots, each of which, generally bearing a fruitstalk not more than half an inch long, gives the plant a very remarkable appearance, and has induced that admirable muscologist Mr. Turner to consider it a distinct species.

10. *P. nanum*; stems short; leaves linear-lanceolate, obtuse, their margins serrated, principally at the extremity as well as the summit of the keels; capsule nearly erect, sub-globose. (Tab. XI.)

P. nanum. *Hedw. St. Cr. v.* 1. *t.* 13. *Menzies in Linn. Trans.—Turn. Musc. Hib. p.* 89. *Engl. Bot. t.* 1625. *Moug. et Nestl. n.* 130. P. subrotundum. *Menzies in Linn. Trans.—Engl. Bot. t.* 1624. P. pumilum. *Swartz Musc. Suec. t.* 9. *f.* 19. *Hedw. Sp. Musc. t.* 21. *Dill. Musc. t.* 55. *f.* 6.

Hab. Moist banks, with *P. aloides*, common.

We are quite unable to find any difference between the *P. nanum* and *subrotundum* of authors; and with regard to the species itself, we have seen capsules in so exactly an intermediate state between this and *P. aloides*, that we have been at a loss to determine to which they should be referred,

and we confess our readiness to subscribe to the opinion of those who may be disposed to consider them all the same species.

## 11. CINCLIDOTUS.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 32 filiform, twisted teeth, anastomosing at their base; *Calyptra* mitriform. (TAB. I.)

The calyptræ of all the specimens we have examined are so far split on one side as to leave some doubt as to the propriety of our calling them mitriform, which we do in deference to preceding botanists. We cannot hesitate, however, to confess that in the present instance we have no great reliance on the character taken from the calyptra, which among other tribes of mosses we have found to be of the greatest importance. The fruit we believe to be terminal, although in the majority of instances situated on branches so short as scarcely to leave room for more than perichætial leaves. The general appearance of the single known species of this genus is that of a *Trichostomum*, whilst the peristome approaches nearer to that of *Tortula*.

1. *C. fontinaloides.* (TAB. XI.)

C. fontinaloides. *Beauv. Prodr. d'Œtheog. p.* 28. *et* 52. *Hooker in Fl. Lond. ed.* 2. (with a figure). Trichostomum fontinaloides. *Hedw. St. Cr. v.* 3. *p.* 36. *t.* 14. *Turn. Musc. Hib. p.* 41. *Smith Fl. Brit.* Fontinalis minor. *Linn. Sp. Pl. p.* 1571. *Engl. Bot. t.* 557.—*Dill. Musc. t.* 33. *f.* 2.

HAB. Growing on stones and wood in streams of water.

Plant from four to six inches long, branched, of a dark lurid green colour. Leaves imbricating the stem on every side, elliptico-lanceolate, acuminated, margined, entire, flexuose, curled when dry, nerve strong. Perichætial leaves nearly as long as the fruit, much acuminated. Fruitstalks shorter than the capsule. Capsules oblong, smooth, brown. Lid conico-acuminated. Peristome bright red, rigid, arising from the reticulated membrane; teeth numerous, capillary, slightly twisted, below anastomosing.

## 12. TORTULA.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 32 filiform, twisted teeth, more or less united at the base by a tubiform membrane; *Calyptra* dimidiate. (TAB. II.)

Not only in the *Syntrichiæ* of Bridel and Mohr, but in several other species of the present genus, the membrane uniting the teeth at the base is sufficiently visible, as well in *T. cuneifolia* as in *T. muralis*, *T. tortuosa*, and *T. unguiculata*; so that we cannot avoid re-uniting the *Syntrichiæ* with the older genus *Tortula*.

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1. *T. rigida*; stems scarcely any; leaves patent, oblong, rigid, their margins much inflexed, nerve broad; capsule oblong, lid conical, acuminate. (TAB. XII.)

   T. rigida. *Swartz Musc. Suec.—Turn. Musc. Hib. p.* 43. *Engl. Bot. t.* 180. Barbula rigida. *Hedw. St. Cr. v.* 1. *t.* 25.—*Dill. Musc. t.* 48. *f.* 47.

   HAB. Clay banks.

   This species differs from all its congeners in the rigidity of its leaves, their broad nerve and very involute margins, as well as in the peristome, of which the laciniæ are short, distant, and slightly twisted. It is remarkable that botanists in general, and Mohr especially, who is so attentive to the structure of the leaves of mosses, have omitted to notice the nerve, which is very broad and very apparent when the margins of the leaf are unrolled by art. Some specimens which we have received from Sweden have the leaves so broadly ovate and obtuse as to be nearly rotundate, yet we do not think that they can be more than varieties.

2. *T. muralis*; stems short; leaves patent, lineari-oblong, their margins recurved, nerve produced beyond the leaf into a white hair-like point; capsule oblong; lid conical, acuminate. (TAB. XII.)

   T. muralis. *Hedw. Sp. Musc.—Swartz Musc. Suec.—Turn. Musc. Hib. p.* 50. *Engl. Bot. t.* 2033. Barbula muralis. *Mohr.—Moug. et Nestl. n.* 127. T. æstiva. *Brid.—Dill. Musc. t.* 45. *f.* 14.

   HAB. On walls and stones.

   This and *T. muralis* are the only British species whose nerves terminate in diaphanous hair-like points. The *T.*

*æstiva* of Bridel, however, is only a variety of this, having no piliferous leaves; specimens of this we have seen which were collected by Mr. Eagle.

3. *T. ruralis*; stems elongated; leaves oblong, carinated, patent, and recurved; nerve terminating in a long, generally diaphanous, serrated point; capsule oblong; lid subulate; teeth of the peristome united below into a tube. (Tab. XII.)

T. ruralis. *Ehrh.—Swartz Musc. Suec.—Turn. Musc. Hib. p.* 50. *Engl. Bot. t.* 2070. Barbula ruralis. *Hedw. Sp. Musc.—Moug. et Nestl. n.* 26. Syntrichia ruralis. *Brid.—Mohr.* Bryum rurale. *Linn. Sp. Pl.—Dill. Musc. t.* 45. *f.* 12.

Hab. On trees as well as banks, and roofs of houses.

This plant grows in thick tufts, and may be met with in almost all situations where other mosses will grow. We have seen it on banks forming the sea-shore, and also on Mont Cenis on the edge of the limits of perpetual snow. A variety growing on trees having broader leaves and shorter hair-points resembles *T. mucronifolia* of Schwaegrichen so nearly, that we cannot avoid considering them as the same plant.

4. *T. subulata*; stems very short; leaves oblong-lanceolate, acuminate, the nerve excurrent, often forming an apiculus; capsule cylindrical; lid conico-subulate; teeth of the peristome united nearly to the apex into a long tube. (Tab. XII.)

T. subulata. *Hedw. Sp. Musc. t.* 27. *Turn. Musc. Hib. p.* 44. *Engl. Bot. t.* 1101. Barbula subulata. *Moug. et Nestl. n.* 126. Syntrichia subulata. *Brid.—Mohr.* Bryum subulatum. *Linn. Sp. Pl. p.* 1581.—*Dill. Musc. t.* 45. *f.* 10.

Hab. Banks, common.

This species possesses the largest leaves by far of any of our British species, although the stems are extremely short and unbranched; but they are sometimes furnished with innovations. The leaves are moreover succulent, pellucid in their lower half, curled when dry. The nerve is more or less protruded beyond the acuminated extremity of the leaf, but we have never seen it diaphanous. The capsules are long, cylindrical, sometimes, especially when old, curved; the lid long, subulate; the peristome also long, forming a bright red tube; the laciniæ free only at the end, where they form a small twisted sort of brush. In habit as well as in place of growth it is nearly allied to the following.

5. *T. cuneifolia*; stems scarcely any; leaves broadly obovate, concave, nerve terminating beyond the top of the leaf in a rather long and frequently serrulated point; capsule oblong;

lid shortly rostrate; teeth of the peristome united for a short way at the base. (Tab. XII.)

T. cuneifolia. *Roth Fl. Germ. v.* 3. *p.* 213. *Turn. Musc. Hib. p.* 51. *Engl. Bot. t.* 1510. Bryum cuneifolium. *Dicks.—Dill. Musc. t.* 45. *f.* 15.

Hab. On banks and in fields, particularly common in Devonshire, especially near Torquay and the mountainous country about Tor-point.

The colour of this plant inclines much to yellow, both in the leaves and fructification; the former approach in texture those of *T. subulata*, than which it is much smaller.

6. *T. stellata*; stems scarcely any; leaves ovate, concave, nerve running beyond the points; capsule ovate, striated, lid rostrate. (Tab. XII.)

T. stellata. *Engl. Bot. t.* 2384. Bryum stellatum. *Dicks.* (without the synonyms.) Barbula agraria. *Hedw. St. Cr. v.* 3. *t.* 6.

Hab. Scotland, *Mr. Dickson.*

This minute plant, which has very much the delicacy of structure and reticulation of the leaves of *T. cuneifolia*, has been found only by Mr. Dickson in Britain "ad aggeres et rivulorum margines Scotiæ." We have compared some original specimens from Mr. Dickson with the West Indian *Barbula agraria*, sent by the younger Hedwig to Mr. Turner, and we find them to coincide in every particular: a point indeed already determined by the author of the *Muscologia Hibernica*. This then appears to be one of the few instances of a plant of the tropics having been found in so northern a region.

7. *T. tortuosa*; stems elongated, branched; leaves lineari-subulate, carinate, undulate, much twisted when dry; capsule cylindrical, lid rostrate. (Tab. XII.)

T. tortuosa. *Hedw. Sp. Musc. p.* 124. *Turn. Musc. Hib. p.* 52. *Engl. Bot. t.* 1708. Barbula tortuosa. *Schwaegr. Suppl. t.* 33. *Moug. et Nestl. n.* 314. Bryum tortuosum. *Linn.—Dill. Musc. t.* 48. *f.* 40.

Hab. Subalpine countries, principally on limestone rocks.

This differs from all the British species of *Tortulæ* by the great length of the stems, and by the undulated margins of the leaves when moist, and their remarkably crisped appearance when dry. *Barbula inclinata* figured in Schwaegrichen's *Suppl.* comes very near this species: but its stems are short, its leaves nearly linear, and its capsule inclined.

8. *T. fallax*; stems elongated, branched; leaves lanceolato-subulate, patent or recurved, their margins reflexed; capsule oblong; lid rostrate, nearly as long as the capsule. (Tab. XII.)

T. fallax. *Swartz Musc. Suec. p.* 40. *Turn. Musc. Hib. p.* 48. *Engl. Bot.* 1708. Barbula fallax. *Hedw. St. Cr. v.* 1. *t.* 24. T. unguiculata. *Turn. Musc. Hib. p.* 47. *Engl. Bot. t.* 2316. (not of *Hedw.*) T. imberbis. *Engl. Bot. t.* 2329.—*Dill. Musc. t.* 48. *f.* 46, 47.

HAB. On walls, banks, and in fields among grass.

We know of no plant of this genus that varies so much in the size of the stems as this, so that the dwarfish individuals growing in dry fields would scarcely be believed to be the same as those luxuriant specimens found on the moist banks of rivers. In the former situation, when about half an inch or somewhat more in height it agrees with the *T. unguiculata* of Smith; when an inch and upwards it becomes *T. fallax*, and when nearly two inches it is the *T. linoides* of Bridel. In the leaves too there is some difference, being in the last-mentioned variety longer and sharper than in the others. The direction of these leaves is usually recurvo-patent, and we have never seen them so decidedly recurved as in the figure of *T. fallax* in Hedwig's *Stirpes*. The *T. imberbis* of Smith agrees with the most usual appearance of *T. fallax*.

9. *T. revoluta*; stems short; leaves lanceolate, acuminate, the margins of those of the stem remarkably revolute; perichætial leaves sheathing, their sides involute; capsule oblong; lid rostrate, shorter than the capsule. (TAB. XII.)

T. revoluta. *Brid. in Schrader's Journ. an.* 1800. *v.* 1. *p.* 299. Barbula revoluta. *Mohr.—Schwaegr. Suppl. t.* 33. T. nervosa. *Engl. Bot. t.* 2383.

HAB. Banks.

In general habit this approaches very nearly to the *T. fallax*; but differences may be perceived in the remarkable revolution of the margin of the leaves, whilst in the species last mentioned they are only recurved, and especially in the perichætial leaves, which in this entirely sheath the lower part of the fruitstalk as in *T. convoluta*.

10. *T. unguiculata*; stems branched; leaves linear-lanceolate, obtuse, their nerve produced into an apiculus, the margins nearly plane; capsule oblong; lid rostrate, nearly as long as the capsule. (TAB. XII.)

Barbula unguiculata. *Hedw. St. Cr. v.* 1. *t.* 23. *Moug. et Nestl. n.* 27. T. mucronulata. *Swartz.—Turn. Musc. Hib. p.* 47. *Engl. Bot. t.* 1299. T. aristata. *Engl. Bot. t.* 2392. Bryum aristatum. *Dicks.*—T. barbata. *Engl. Bot. t.* 2391. T. humilis. *Turn. Musc. Hib. p.* 45. *Engl. Bot. t.* 1663. T. apiculata. *Turn. Musc. Hib. p.* 46. *Engl. Bot. t.* 2494.—*Dill. Musc. t.* 48. *f.* 48, 49. A.

HAB. On banks and hedges.

We have not ventured to quote the numerous synonyms just cited, without an examination of authentic specimens, by which we are persuaded they are all correct. This is one of the most common of mosses, and varies much in the length of its stems; the annotinous shoots sometimes giving the fruitstalk a lateral appearance, which truly never takes place in any known British *Tortula*. The figure of the leaves is very nearly the same in all the states of the plant we have seen, and very unlike that of *T. fallax*.

11. *T. convoluta*; stems short; leaves oblong, rather obtuse, nerve not produced beyond the point; their margins plane or slightly incurved; perichætial leaves sheathing, acute, remarkably convolute; capsule oblong, lid rostrate. (Tab. XII.)

T. convoluta *Swartz Musc. Suec.—Engl. Bot. t.* 2382. *Turn. Musc. Hib. p.* 49. Bryum convolutum. *Dicks.*—Barbula convoluta. *Hedw. St. Cr. v.* 1. *t.* 32. *Moug. et Nestl. n.* 218.—*Dill. Musc. t.* 48. *f.* 44.

Hab. Moist banks.

This is by no means an uncommon species, resembling in its perichætial leaves *T. revoluta*; but the cauline leaves are totally different, having their margins rather incurved than revolute. The nerve is pale: the stems are small, much branched with innovations: the fruitstalks long in proportion to the rest of the plant, of a pale yellowish colour like *Trichostomum pallidum*. Hedw.

## 14. ENCALYPTA.

Gen. Char. *Fruitstalks* terminal; *Peristome* single, of 16 teeth; *Calyptra* campanulate, smooth, entirely inclosing the mature *Capsule*. (Tab. II.)

The anomaly least to have been expected in this very natural genus was the decided difference that exists in the shape of the teeth of the peristome; for while those of *E. vulgaris* and *E. ciliata* are short and lanceolate, those of *E. streptocarpa* are filiform, elongated, and by their close approximation almost forming a tube. The columella too in this last plant is exserted beyond the tops of the teeth, which we have never observed in the two other British species.

1. *E. streptocarpa*; stems elongated; leaves elliptico-lanceolate somewhat obtuse, their nerve not produced beyond the sum

mits; capsule cylindrical, spirally striated; calyptra toothed at the base. (Tab. XIII.)

E. streptocarpa. *Hedw. Sp. Musc. t.* 10. *Engl. Bot. t.* 2163. Bryum ciliare. *Dicks.—Dill. Musc. t.* 43. *f.* 71.

Hab. Stony mountainous countries.

*E. streptocarpa* is very rare in fructification, a state in which we met with it in considerable abundance in the Duke of Athol's grounds at Dunkeld in the month of September 1815.

It is the largest by far of the three British species, often exceeding two inches in length; thickly clothed with leaves, whose nerve is on the back and towards the point slightly serrated, while the margins are entire as in the other species. The present may be distinguished not only by its size, but by its spirally striated capsule, and above all by its deep red, very long, capillary teeth. We may add that the lid is spirally striated, in which circumstance as well as by the shape and texture of the leaves it has a strong affinity with *Tortula subulata*.

2. *E. vulgaris*; stems short; leaves oblongo-elliptical, obtuse, their nerve produced a little beyond the summits; capsule cylindrical, smooth; calyptra entire at the base. (Tab. XIII.)

E. vulgaris. *Hedw. Sp. Musc. p.* 60. *Turn. Musc. Hib. p.* 17. *Moug. et Nestl. n.* 17. Leersia vulgaris. *Hedw. St. Cr. v.* 1. *t.* 18. Bryum extinctorium. *Linn. Sp. Pl.—Engl. Bot. t.* 558.—*Dill. Musc. t.* 45. *f.* 8.

Hab. On banks, walls, and rocks, principally such as are calcareous.

This is the only species which has a calyptra entire at the base, by which circumstance it is chiefly to be distinguished from *E. ciliata*. It is difficult to examine the peristome of this, from the facility with which it separates along with the lid, both generally coming away by the removal of the calyptra.

3. *E. ciliata*; stems short; leaves oblong, acuminate, nerve produced considerably beyond the summit; capsule cylindrical, calyptra toothed at the base. (Tab. XIII.)

*α. concolor*; leaves apiculate, their points of the same colour, capsule smooth.

E. ciliata. *Hedw. Sp. Musc. t.* 61. *Turn. Musc. Hib. p.* 18. *Engl. Bot. t.* 1418. Leersia ciliata. *Hedw. St. Cr. v.* 1. *t.* 19. Bryum extinctorium *β. Linn. Sp. Pl. p.* 1581.—*Dill. Musc. t.* 45. *f.* 9.

*β. alpina*; leaves much acuminate, their points diaphanous, capsule smooth.

E. alpina. *Engl. Bot. t.* 1419. E. affinis. *Hedw. fil. in Web. et Mohr Beitr. t.* 4. *Schwaegr. Suppl. t.* 16.

γ. *rhaptocarpa*; leaves apiculate, points of the same colour; capsule longitudinally striated when old.

E. rhaptocarpa. *Schwaegr. Suppl. t.* 16.

Hab. α. On mountains, not uncommon. β. Scotch alps, *Mr. Donn*, and on Ingleborough, Yorkshire. γ. On Ben Bulben, Ireland, *Mr. Mackay*.

We have, by means of numerous specimens gathered on the Swiss alps, been enabled to trace the varieties enumerated to approach so completely to one another, that we have not hesitated to consider them as belonging to the same plant. The teeth at the base of the calyptra are of so fragile a nature, that in by far the greater number of specimens they are destroyed; and hence we find the calyptra of the two varieties β. and γ. figured entire. The β. *alpina* differs from α. *concolor* in having its upper leaves principally more acuminated and diaphanous at their points; whilst γ. *rhaptocarpa* may be easily known by its having the capsule when old more or less distinctly striated longitudinally. The teeth of the peristome in this and the preceding species are lanceolate, and of a pale red colour.

## 15. GRIMMIA.

Gen. Char. *Fruitstalks* terminal; *Peristome* of 16 entire or perforated, rarely cleft, equidistant teeth; *Calyptra* mitriform. (Tab. II.)

This is a genus so closely bordering on *Trichostomum*, that it is not possible to form either a natural or artificial character that may decidedly distinguish them. We have rather retained it in deference to the opinion of preceding botanists, than from a thorough conviction of the propriety of so doing. *Grimmia ovata* and *Grimmia pulvinata* have sometimes the teeth divided; the latter indeed generally.

### * *Fruitstalks scarcely any.*

1. *Gr. apocarpa*; stems branched; leaves ovato-lanceolate, recurvo-patent, their margins reflexed; the perichætial ones having their nerve disappearing immediately below their summits: capsule ovate, sessile; lid shortly rostrate. (Tab. XIII.)

*α. nigro-viridis*; foliis latioribus, nigro-viridibus.

Gr. apocarpa. *Hedw. St. Cr. v.* 1. *t.* 39. *Turn. Musc. Hib. p.* 20. *Engl. Bot. t.* 1134. *Moug. et Nestl. n.* 17. Grimmia alpicola. *Swartz Musc. Suec. t.* 1. *Hedw. Sp. Musc. t.* 15. Grimmia alpicola *β.* and *γ. Wahl.—Fl. Lapp.* Grimmia rivularis. *Bridel in Schrad. Journ. v.* 5. *t.* 3. *Turn. Musc. Hib. p.* 21. *t.* 2. *f.* 2. *Schwaegr. Sp. Musc. Suppl. part.* 1. *t.* 23. Grimmia gracilis. *Schwaegr. Sp. Musc. Suppl. t.* 23. Grimmia apocaula. *Hoffm.—Moug. et Nestl. n.* 18.—*Dill. Musc. t.* 32. *f.* 4.

*β stricta*; caule elongato, foliis angustioribus rufescentibus.

Grimmia stricta. *Turn. Musc. Hib. p.* 20. *t.* 2. *f.* 1.

Hab. Var. *α.* on trees and on rocks in humid places, as well as in alpine rivulets. *β.* On rocky places in elevated mountains.

We heartily accord with Bridel when he says of this species "adeo diversiformis et pro sedis conditione ita varians ut verus Proteus sit." Upon trees and on humid rocks the stems vary much in length, and are from one to two or three inches long, usually every where clothed with leaves; these leaves moreover are at their summits not unfrequently terminated by diaphanous points; from which slight differences, added to the more or less branched habit, have arisen the *Grimmia alpicola* and the *Gr. apocarpa* of authors. When growing on rocks in mountain streams its length is still greater, the branches somewhat more fastigiate, the leaves decayed at the base, every-where of a darker colour, and never furnished with diaphanous points; hence the *Gr. rivularis*: whilst on elevated mountains a variety has been found, (the *Gr. stricta* of Mr. Turner,) whose slender, often straight and brittle branches, and red-brown colour, might at first lead to the suspicion of its being a distinct species; but its leaves differ in no essential particular, and the capsule in all the varieties is liable to no small degree of difference in form, being more or less ovate, but sometimes, especially when the lid has fallen, turbinate. The *Gr. gracilis* of Schwaegrichen we rather refer to our var. *α.* on account of its colour. Wahlenberg has considered the *Gr. stricta* and *Gr. rivularis* as varieties of his *alpicola*, and has separated them all from *Gr. apocarpa* by their want of the diaphanous points to the leaves.

2. *Gr. maritima*; stems short, pulvinate; leaves lanceolate, acuminate, nearly erect, crisped when dry, their margins recurved, the perichætial ones with their nerve running beyond the summits; capsule ovate, sessile; lid shortly rostrate. (Tab. XIII.)

Gr. maritima. *Turn. Musc. Hib. p.* 23. *t.* 5. *f.* 2. *Engl. Bot. t.* 1645. Gr. alpicola *δ. Wahl. Fl. Lapp.*

Hab. On rocks by the sea-shore.

Proteus-like as is *Gr. apocarpa*, we cannot agree with Wahlenberg in supposing this to belong to any one of its varieties. It has a short and peculiarly tufted mode of growth like that of *Gr. pulvinata*; its leaves are narrower than those of *Gr. apocarpa*, resembling in shape those of *Gr. ovata*, but are more erect than either, never hair-pointed, and decidedly crisped when dry. The perichætial leaves too afford, we think, additional characters; for they are long, narrow, concealing the fruit, and have a remarkably brown, strong, excurrent nerve. The peristome in the last as in the present species, is sometimes entire; but more frequently irregularly perforated.

* * *Fruitstalks longer than the leaves.*

† *Fruitstalks curved.*

3. *Gr. saxicola*; stems scarcely any; leaves lineari-subulate, crisped when dry; capsule ovate; fruitstalks geniculate; lid rostrate, straight. (Tab. XIII.)

Dicranum saxicola. *Mohr.*—Grimmia geniculata. *Schwaegr. Suppl. t.* 22.

Hab. On sand-rocks in Sussex, *Mr. Borrer*. On granite rocks in the Dublin mountains.

Mohr does not appear to have seen the calyptra of this species, which is mitriform as in the genus *Grimmia*, multifid at the base, and adhering so closely to the lid as not to be separated without it from the capsule. The stems are shorter than in any of the British *Grimmiæ*; and this circumstance, together with the general shape of the leaves and minute size of the whole plant, renders it difficult to be distinguished at first sight from *Weissia trichoides*, among which Mr. Borrer finds it growing. It has a still closer affinity with *Weissia recurvata*, especially in the bent fruitstalks; but this last has them curved, not geniculate, and leaves shorter and more setaceous.

4. *Gr. pulvinata*; stems short, pulvinate; leaves narrow-elliptical, their margins recurved, points diaphanous, piliform: capsule ovate, striated; fruitstalks curved, lid conical, acuminate. (Tab. XIII.)

Gr. pulvinata. *Engl. Bot. t.* 1728. *Hooker in Fl. Lond. ed.* 2. (with a figure.) Dicranum pulvinatum. *Swartz.—Turn. Musc. Hib. p.* 78. *Moug. et Nestl. n.* 124. Fissidens pulvinatus. *Hedw. Sp. Musc. t.* 40. *Dill. Musc. t.* 50. *f.* 65.

Hab. On walls and rocks.

This species is very nearly allied to *Trichostomum funale* of Schwaegrichen, but differs from it in its smaller size, broader and elliptical leaves, which are more suddenly acuminate. The teeth of the peristome are generally perforate or deeply cleft, more rarely entire; hence it has by some authors been put among the *Dicrana*, and by others among the *Trichostoma*.

†† *Fruitstalks straight.*

5. *Gr. Daviesii*; stems short; leaves lanceolato-acuminate, carinate, entire, much crisped when dry, their margins recurved; those of the perichætium broad and convolute; capsule turbinate, lid rostrate. (Tab. XIII.)

Gr. Daviesii. *Turn. Musc. Hib. p.* 24. Bryum Daviesii. *Dicks.*—Encalypta Daviesii. *Engl. Bot. t.* 1281.

Hab. On maritime rocks. In Wales, the *Rev. H. Davies*. In Ireland, common.

This plant has many characters in common with *Trichostomum ellipticum*; as the shape of the leaves, which are however much longer and more crisped when dry; of the capsule, but which is more truncate; and of the peristome, which having its teeth generally split in *T. ellipticum* are in *Gr. Daviesii* always entire. The general colour of the present plant is brownish like that of *Gr. maritima*, with which it is frequently found growing.

6. *Gr. ovata*; stems slightly branched; leaves lanceolato-subulate, gradually produced into long, diaphanous, hair-like points, their margins incurved; capsule ovate; teeth of the peristome often perforated and split; lid rostrate. (Tab. XIII.)

Gr. ovata. *Web. et Mohr, Fl. Suec. t.* 2. *f.* 4. *Schwaegr. Suppl. t.* 24. *Hooker in Fl. Lond. ed.* 2. (with a figure.) *Moug. et Nestl. n.* 311. Dicranum ovatum. *Hedw. St. Cr. v.* 3. *t.* 34. *Swartz.*—Dicranum ovale. *Hedw. Sp. Musc.—Turn. Musc. Hib. p.* 77. *Engl. Bot. t.* 2165. Trichostomum ovatum. *Mohr.* Bryum ovale. *Dicks.* Gr. obtusa. *Schwaegr. Suppl. t.* 25. *Moug. et Nestl. n.* 458.

Hab. Alpine rocks.

We do not hesitate to make the *Gr. obtusa* of Schwaegrichen a synonym to this, since we have Mougeot and Nestler's specimens, which precisely accord with our plant, as indeed does Schwaegrichen's figure. From *Gr. pulvinata* it differs in not having the fruitstalks curved at any time, in its smooth capsule, in its narrow and gradually acuminated leaves, and in its place of growth, this being altogether alpine.

7. *Gr. Donniana*; stems short; leaves lanceolato-subulate, produced into long, diaphanous, hair-like points, their margins incurved; capsule ovate, teeth of the peristome quite entire; lid shortly rostrate. (Tab. XIII.)

Gr. Donniana. *Engl. Bot. t.* 1259. Gr. sudetica. *Schwaegr. Suppl. t.* 24?

Hab. On rocks in mountainous districts.

It must be confessed that the present species is so nearly allied to the preceding, that if great importance were not always attached to the peristomes of mosses we should have found it impossible to distinguish them. *Gr. Donniana* is a very much smaller plant, and the leaves are of a brighter, though still a dark green colour, larger in proportion to the fruitstalk, which thus seems half immersed. The teeth of the peristome we have never been able to find either perforated or split, on which account we quote hesitatingly the *Gr. sudetica* of Schwaegrichen, which agrees well with our plant in other respects. The lid we may observe is rather shorter and more obtuse than in *Gr. ovata*, but on this much reliance cannot be placed.

## 16. PTEROGONIUM.

Gen. Char. *Fruitstalks* lateral; *Peristome* single, of 16 entire, equidistant teeth; *Calyptra* dimidiate. (Tab. II.)

Mohr has, we think, contrary to nature, united this genus with *Weissia* and *Grimmia*, from which its lateral fruit and altogether hypniform habit will always keep it distinct.

1. *Pt. Smithii*; stems much branched, branches pinnate; leaves lingulate, obtuse, entire, crisped when dry, their margins recurved, nerve reaching above half way up; fruitstalks very short; lid rostrate. (Tab. XIV.)

Pt. Smithii. *Swartz in Schrad. Journ. v.* 2. *p.* 173. *Engl. Bot. t.* 1326. Hypnum Smithii. *Dicks. Crypt. fasc.* 2. *t.* 5. *f.* 4. *Hedw. Sp. Musc. t.* 68.

Hab. Trunks of trees in the southern parts of England; abundant in Devonshire.

This elegant moss differs from the remaining British *Pterogonia* by the stems being very much branched, and in these as well as the leaves curling remarkably when dry; the fruit too, which is very scarce, is nearly sessile; the fruitstalk slightly curved.

2. *Pt. gracile*; branches fascicled, curved; leaves broadly ovate, acute, concave, their margins plane, summits serrated, faintly two-nerved at the base; lid conical. (Tab. XIV.)

Pt. gracile. *Swartz Musc. Suec. p.* 26. *Engl. Bot. t.* 1085. Pterigynandrum gracile. *Hedw. St. Cr. v.* 4. *t.* 6. Grimmia ornithopodioides. *Mohr.*—Hypnum gracile. *Linn.*

Hab. Rocks in sub-alpine countries.

Miss Hutchins found a variety of this species with the leaves unusually broad, and the whole plant of a blackish green colour. A careful examination of good specimens of the fruit of this plant will exhibit something of an inner peristome, viz. a very narrow membrane as at the base of the cilia of *Neckera*, yet terminating so irregularly as not to justify us in placing this among the mosses which have a double peristome.

3. *Pt. filiforme*; stems irregularly branched, curved; leaves ovate, sub-acuminated, concave, their margins recurved, serrated, nerve single or forked, short, faint; lid conical. (Tab. XIV.)

Pt. filiforme. *Hedw. St. Cr. v.* 4. *t.* 7. *Engl. Bot. t.* 2297. *Moug. et Nestl. n.* 210. Pt. cæspitosum. *Engl. Bot. t.* 2526. Grimmia filiformis. *Mohr.*—Hypnum cylindricum. *Dicks.*—*Smith Fl. Brit.*

Hab. Mountains in Scotland and Ireland; very rare.

In this and the preceding species the leaves are closely imbricated and subsecund, but the present plant is the smaller and more slender of the two. The cellules of the leaves are larger than in *Pt. gracile* and project on the back and margins, which gives them a papillose appearance as in *Hypnum catenulatum*, *H. proliferum*, and a few others. The nerve of the leaf though sometimes scarcely visible, is at others more evident, single, or forked so as to resemble that of *Pt. gracile*. We have examined specimens of the *Pt. cæspitosum* of *English Botany*, which differ in nothing from *Pt. filiforme* but in being somewhat larger, and in having the branches less attenuate.

## 17. WEISSIA.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* single, of 16 entire, equidistant teeth; *Calyptra* dimidiate. (TAB. II.)

We cannot agree with Mohr in uniting this genus with the *Grimmiæ*, to which it bears a relation similar to that of *Didymodon* to *Trichostomum* and of *Gymnostomum* to *Anictangium*, genera which are now universally adopted.

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* *Capsule with an apophysis.*

1. *W. splachnoides*; leaves lingulate, rounded at the top, their nerve disappearing before the summit; capsule obovate, apophysis obconical; lid convex, acuminulate. (TAB. XIV.)

W. splachnoides *Schwaegr. Suppl. t.* 17. Grimmia splachnoides. *Engl. Bot. t.* 2164? Splachnum lingulatum. *Engl. Bot. t.* 2095. *Dicks. Crypt. fasc.* 4. *t.* 10. *f.* 6.

HAB. Turf bogs on the Scotch alps.

Although this plant have the habit, leaves, capsule, and apophysis, as well as place of growth of the *Splachna*, yet the peristome presenting teeth at equal distances decides that it should be arranged under the genus *Weissia*. The species most nearly allied to the present plant is *Splachnum reticulatum*, which, besides the configuration of the peristome, may be known by its smaller size, much shorter fruitstalks, and ovate (not lingulate) leaves. In both the leaves are remarkably obtuse, of a dark colour, strongly reticulated, and glossy when dry. The *Grimmia splachnoides* figured in *English Botany* represents our plant in the magnified capsule, but not in the leaves.

2. *W. Templetoni*; leaves ovato-lanceolate, acute; capsule (with the apophysis) narrowly pyriform; lid nearly plane. (TAB. XIV.)

W. Templetoni. *Hooker in Fl. Lond. ed.* 2. (with a figure.) Funaria Templetoni. *Engl. Bot. t.* 2524.

HAB. Wet banks in various parts of Ireland.

This species with the *W. radians* of Hedwig has the same affinity to *Funaria* as *Pterogonium* has to *Hypnum*, viz. agreeing with it in general habit, and differing only in

the want of the inner peristome: it may at a future time become the subject of a new genus. The apophysis is very narrow; and the teeth of the peristome lie horizontally over the mouth of the capsule, as do those of *Funaria*.

** *Capsule destitute of an apophysis.*

† *Leaves nerveless.*

3. *W. nuda*; stems scarcely any; leaves ovato-lanceolate, nerveless; capsule ovate, gibbous on one side, cernuous. (Tab. XIV.)

Bryum nudum. *Dicks. Crypt. fasc.* 4. *t.* 10. *f.* 15. Grimmia nuda. *Turn. Musc. Hib. p.* 25. *Engl. Bot. t.* 1421. Weissia rosea. *Wahl. Fl. Lapp. t.* 19. Weissia incarnata. *Schwaegr. Suppl. t.* 18.

Hab. On a clayey soil in the north of England and Scotland.

If there were not abundant other marks of discrimination between this and the rest of the British species of *Weissia*, the greater size of the annulus, and the nature of the teeth which are broad and split from their centre to their base, might be adduced as peculiarities of this singular plant. This too is the only one of our species which has the leaves destitute of a nerve; these as maturity advances become of a reddish colour, whence Wahlenberg's expressive name of *rosea*, and Schwaegrichen's scarcely less so of *incarnata*. We have however been obliged to retain the name given to it by its first describer, our countryman and acute cryptogamist Mr. Dickson. The plant still exists in the spot originally pointed out by Mr. Caley near Manchester, whence we have received it from Mr. Hobson. The late Mr. Donn found it by the sides of the Tay, near Perth.

†† *Leaves furnished with a nerve.*

← *Leaves ovate or lanceolate.*

4. *W. nigrita*; stems elongated; leaves lanceolate, acuminated; capsule obovate, cernuous, gibbous, sulcate; lid hemispherical, obtusely pointed. (Tab. XIV.)

W. nigrita. *Hedw. St. Cr. v.* 3. *t.* 39. Bryum nigritum. *Dicks.*— Grimmia nigrita. *Engl. Bot. t.* 1825.

Hab. Moist banks in mountainous districts.

This plant has a capsule still more remarkable for its inclination than the preceding, and is truly arcuato-cernuous. In all the remaining British *Weissiæ* the capsule is either erect or very nearly so.

5. *W. Starkeana*; stems very short; leaves ovate, with an excurrent nerve; capsule ovate, erect; lid conical; teeth of the peristome subulate, acute. (Tab. XIV.)

W. Starkeana. *Hedw. St. Cr. v.* 3. *t.*23. Bryum minutum. *Dicks.*—Grimmia Starkeana. *Engl. Bot. t.* 1490.

Hab. Banks and fields.

That this is the *Weissia Starkeana* of Hedwig's *Stirpes* there cannot we think be the least doubt; but that the following species has been frequently mistaken for it, the specimens in our possession received from various friends will clearly testify. In this however the teeth are very apparent on the removal of the operculum from a fully formed capsule, nor are they so fugacious as the peristome of many mosses of this family. The leaves are somewhat patent, ovate, sometimes inclining a little to lanceolate, acute, their margins slightly recurved, their nerve excurrent and forming an apiculus.

6. *W. affinis*; stems very short; leaves ovate, with an excurrent nerve; capsule ovate, erect; lid conical; teeth of the peristome short, broad, and obtuse. (Tab. XIV.)

Hab. Fields and on gravelly banks.

Except by its smaller size and paler colour we know of no means of distinguishing this moss from the preceding one but by an examination of the peristome; and this is so remarkably different in the two, and each is so constant in its characters, that we think ourselves fully warranted in making two species of them. The peristome consists of 16 broad and very obtuse, somewhat membranaceous, whitish teeth, extremely faintly striated, and resembling in all particulars the peristome of *W. trichodes* hereafter to be described; but in that plant the peristome first forms a horizontal membranous ring about the mouth of the capsule and then rolls back into 16 teeth, whereas in our plant we have always seen the peristome to be erect.

It may be remarked that in the general growth and habit, and in the form and structure of the leaves, there is the greatest similarity between the present species, *W. Starkeana*, and *W. lanceolata*, and their only essential differences are to be looked for in the operculum and teeth of the peristome.

7. *W. lanceolata*; stems somewhat elongated; leaves ovate, with an excurrent nerve; almost piliferous; capsule ovate; lid obliquely rostrate. (Tab. XIV.)

Leersia lanceolata. *Hedw. St. Cr. v. 2. t. 23.* Grimmia lanceolata. *Engl. Bot. t.* 1408. *Mohr.—Moug. et Nestl. n.* 310. Grimmia aciphylla. *Mohr.*—Encalypta lanceolata. *Turn. Musc. Hib. p.* 19. Bryum lanceolatum. *Dicks.*

HAB. On moist banks.

This plant is only to be distinguished from *W. Starkeana* (to which it is very nearly allied) by the larger size, by the narrower leaves, their laxer reticulation and more excurrent nerve, and by its rostrate lid. In general habit it approaches *Gymnostomum truncatulum*, particularly the larger varieties of it, but its leaves are more erect and more closely imbricated, and the apiculus is longer. We have examined authentic specimens from Dr. Mohr of his *Grimmia aciphylla*, and we fully accord with Schwaegrichen that it is not to be distinguished from our plant.

*+ + Leaves linear or subulate.*

8. *W. striata*; leaves linear, denticulate, crisped when dry; capsule ovato-turbinate, sulcate, erect; lid obliquely subulate. (TAB. XV.)

*α. minor*; leaves lineari-subulate, subserrulate.

Grimmia striata. *Schrad. Diar. Bot. v. 2. p.* 57. Weissia fugax. *Hedw. Sp. Musc. t.* 13. *Moug. et Nestl. n.* 407. W. Schisti. *Schwaegr. Suppl. t.* 20. (not of *Engl. Bot.*)

*β. major*; leaves broadly-linear, denticulate.

W. denticulata. *Schwaegr. Suppl. t.* 19.

HAB. Banks in alpine countries.

The variety *β.*, the *W. denticulata* of Schwaegrichen, has the leaves strongly denticulate and much broader than in the common appearance of *W. striata*; yet we have gathered so many specimens in intermediate states, that we cannot feel satisfied in considering them otherwise than as varieties. The *W. Schisti* (of Schwaegr.) has the leaves more carinate, and narrower. Of this state of *W. striata* we have seen none but foreign specimens; those from which the figure in *English Botany* is taken being *W. acuta*. The capsules in all the varieties are sulcate, and have quite the same figure; and the lid is constantly rostrate from a flat base.

9. *W. trichodes*; stems scarcely any; leaves subulato-setaceous, entire; capsule ovate, striated; lid rostrate. (TAB. XV.)

Gymnostomum trichodes. *Mohr Cr. Germ.*—Anictangium trichodes. *Schwaegr. Suppl. t.* 12. Grimmia trichodes. *Engl. Bot. t.* 2563.

HAB. On granite rocks moistened by the spray of a rivulet, near Dublin. Sand rocks near Henfield, Sussex, *Mr. Borrer.*

The curious peristome of this plant in an early stage represents only a membranous ring lying horizontally within the edge of the mouth of the capsule: this however as maturity advances splits into 16 equal, short, and very obtuse teeth, which become erect and afterwards reflexed over the mouth of the capsule. In this state Mohr seems to have examined it, and consequently ranged it under his *Gymnostoma*. Schwaegrichen, taking into consideration the situation of the male flowers, has classed it under his *Anictangium*. An evident annulus is present. The minute plants most nearly resembling this, and only to be distinguished from it by a close inspection, are *W. pusilla* and *Gymnostomum tenue*.

10. *W. cirrata*; leaves broadly subulate, crisped when dry, their margins recurved; capsule ovate; lid rostrate. (Tab. XV.)

W. cirrata. *Hedw. Sp. Musc. t.* 12. *f.* 7. *Moug. et Nestl. n.* 406. Mnium cirratum. *Linn.*—Grimmia cirrata. *Engl. Bot. t.* 2356. Gr. Dicksoni. *Engl. Bot. t.* 1420.—*Dill. Musc. t.* 48. *f.* 42.

Hab. On posts and rails, rarely on banks.

It will require a very attentive examination of the leaves of this moss to distinguish it from *W. crispula*. In our plant the leaves are shorter, wider, carinate, and have their margins recurved; while in *W. crispula* they are truly subulate, rather canaliculate, and have no recurvation whatever of the margin. The capsules are alike in both.

11. *W. curvirostra*; leaves linear-subulate; capsule ovato-cylindraceous; lid rostrate. (Tab. XIV.)

Bryum curvirostrum. *Dicks.*—W. recurvirostra. *Hedw. St. Cr. v.* 1. *t.* 7. Grimmia recurvirostra. *Turn. Musc. Hib. p.* 29. *Engl. Bot. t.* 1438.—*Dill. Musc. t.* 48. *f.* 45.

Hab. On sandy or gravelly moist banks.

The stems of this plant vary exceedingly in length; and its whole habit, as Mr. Turner judiciously observes, much resembles that of the *Tortulæ*, in company with several species of which genus it may often be found growing. The nerve is dark and strong, and gives the leaves a peculiar rigidity.

12. *W. crispula*; stems divided; leaves from a broad base, lanceolato-subulate, crisped when dry, their margins incurved; capsule ovato-elliptical; lid rostrate. (Tab. XV.)

W. crispula. *Hedw. Sp. Musc. t.* 12. *f.* 1-6. Grimmia crispula. *Turn. Musc. Hib. p.* 28. *Engl. Bot. t.* 2203.

Hab. On rocks.

In addition to what we have said under *W. cirrata*, we

may here add that the present species is a smaller plant and of a darker green colour, and has a more decided perichætium.

13. *W. controversa*; stems nearly simple; leaves lineari-subulate, crisped when dry, their margins incurved; capsule ovato-elliptical; lid rostrate. (Tab. XV.)

W. controversa. *Hedw. St. Cr. v. 3. t. 5. Moug. et Nestl. n. 16.* Bryum virens. *Dicks.*—B. viridulum. *Huds.*—Grimmia controversa. *Turn. Musc. Hib. p. 27. Engl. Bot. t. 1367.—Dill. Musc. t. 48. f. 43.*

Hab. Banks, very abundant.

This plant may be distinguished from *W. cirrata* by its having the leaves longer and more linear, with their margins by no means recurved; likewise from *W. crispula* by the former of these two characters, and from both by the smaller size. We have already noticed the similarity of this plant to *Gymnostomum microstomum*, than which it is larger, and has longer and finer fruitstalks. The teeth are of a very pale colour and occasionally split as in the genus *Dicranum*.

14. *W. calcarea*; stems scarcely any; leaves from a broad base, linear, obtuse, thick, with a very broad nerve; capsule turbinate; lid rostrate. (Tab. XV.)

W. calcarea. *Hedw. Sp. Musc. t. 11. f. 1-6.* Bryum calcareum. *Dicks.—Engl. Bot. t. 191.* Grimmia calcarea. *Turn. Musc. Hib. p. 25.*

Hab. On chalk cliffs and stones.

The short, upright, rigid leaves of this plant have a striking appearance, and resemble remarkably in miniature those of *Polytrichum aloides*, to which also their dense texture assimilates them, their upper half consisting almost entirely of their broad nerve, which below is much narrower, passing gradually on each side into the broad pagina.

15. *W. recurvata*; stems scarcely any; leaves subulate; capsule broadly ovate; fruitstalks curved; lid rostrate. (Tab. XV.)

Grimmia recurvata. *Hedw. St. Cr. v. 1. t. 38. Turn. Musc. Hib. p. 24. Engl. Bot. t. 1489.* Bryum curvatum. *Dicks.*

Hab. On sandstone rocks.

The fruitstalk of this plant being always arched when growing or after being gathered, when moistened, sufficiently distinguishes this plant from *W. pusilla*.

16. *W. pusilla*; stems scarcely any; leaves subulate; capsule ovate; fruitstalks always erect; lid rostrate. (Tab. XV.)

W. pusilla. *Hedw. St. Cr. v. 2. t. 29.* Bryum paludosum. *Linn. Sp. Pl.?* Grimmia pusilla. *Engl. Bot. t. 2551.*

Hab. On calcareous rocks, usually.

Mr. Templeton alone seems to have found the true plant of this species growing in dense patches on the white limestone rocks in the neighbourhood of Belfast. We dare not quote the Dillenian figures t. 49, f. 53, &c. usually referred to this plant, for neither they nor the place of growth at all accord with our plant.

17. *W. verticillata*; stems branched; leaves broadly subulate, nearly flat, rather flaccid; capsule ovate; lid rostrate. (Tab. XV.)

W. verticillata. *Schwaegr. Suppl. t.* 20. Bryum verticillatum. *Linn. Sp. Pl.* Bryum fasciculatum. *Dicks.*—Grimmia verticillata. *Turn. Musc. Hib. p.* 31. *Engl. Bot. t.* 1258.—*Dill. Musc. t.* 47. *f.* 35.

Hab. Among trickling water on rocks.

This singular species has the lower part of the stems frequently covered with a white mineral incrustation. The leaves are very plane, straight, erect and almost appressed, and cellular in structure.

18. *W. acuta*; stems branched; leaves subulato-setaceous, subsecund, rigid, canaliculate; capsule turbinate; lid rostrate. (Tab. XIV.)

W. acuta. *Hedw. St. Cr. v.* 3. *t.* 35. W. rupestris. *Hedw. Sp. Musc. t.* 14. Bryum acutum. *Dicks.*—B. splachnoides. *Dicks.*—B. fulvellum. *Dicks. Crypt. fasc.* 4. *t.* 11. *f.* 1. Dicranum fulvellum. *Engl. Bot. t.* 2268. Grimmia acuta. *Turn. Musc. Hib. p.* 29. *Engl. Bot. t.* 1644.—*Dill. Musc. t.* 47. *f.* 34.

Hab. Rocks in alpine countries.

The leaves are remarkably rigid, and the capsule has a swelling at the base resembling an apophysis. The whole plant varies in size, and is, as Mr. Turner has noticed, of a shining brownish-green colour. Authentic specimens from Mr. Dickson, as well as those figured in *English Botany*, enable us to add the synonym of *Dicranum fulvellum*.

## 18. DICRANUM.

Gen. Char. *Fruitstalks* terminal; (except in *D. adiantoides* and *D. taxifolium*) *Peristome* single, of 16 bifid, equidistant teeth; *Calyptra* dimidiate. (Tab. II.)

It is much to be lamented that this genus, including so great

a number of species, and those frequently so anomalous in appearance, cannot be divided according to the principles now so generally adopted by muscologists. The *Fissidentes* of Hedwig have so remarkable a character in the form, structure, and direction of the leaves, that we were almost tempted to depart from the Linnæan rule in taking the generic characters from the fructification, and to employ solely those founded on the difference of foliage. This, however, will form an admirable character for the primary division of the species. Even in the true *Dicrana*, many vary from what we must still regard as the most essential character of the genus; viz. the regularly cleft teeth of the peristome. *D. virens* has the cleft often united at the apices of the segments. In *D. rufescens* the segments are unequal: in *D. spurium* frequently trifid. Those of *D. purpureum* are so deeply divided that we have had no hesitation in removing it to the genus *Didymodon*, with which it likewise accords full as well in habit. Mohr cautions us to distinguish carefully between *Dicr. longifolium* and the foreign *Didymodon longirostrum*, and between the likewise foreign *Dicr. tortile* and *Didymodon homomallum* and *Weissia heteromalla*. This last indeed we believe, as we shall hereafter have occasion to mention, to be nothing more than *Didymodon homomallum*, of which the peristome was not sufficiently examined. But there are other true *Weissiæ*, and *W. acuta* in particular, which bear a very close affinity to *Dicranum*.

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### A. *Leaves inserted in a bifarious manner.* (*Fissidens*. Hedw.)

1. *D. bryoides*; fruitstalks terminal; perichætial leaves resembling the cauline ones. (Tab. XVI.)

α. Capsule erect.

D. bryoides. *Swartz Musc. Suec. t.* 2. *f.* 4. *Engl. Bot. t.* 625. *Turn. Musc. Hib. p.* 53. Fissidens bryoides. *Hedw. St. Cr. v.* 3. *t.* 29. Hypnum bryoides. *Linn. Sp. Pl. p.* 1588. Dicranum viridulum. *Swartz Musc. Suec. t.* 2. *f.* 3. *Engl. Bot. t.* 1368. Bryum viridulum. *Linn.—Dicks. Crypt. fasc.* 1. *t.* 1. *f.* 5. Fissidens exilis. *Hedw. Sp. Musc. t.* 38. *f.* 7-10. Dicranum osmundioides. *Turn. Musc. Hib. p.* 55. *Engl. Bot. t.* 1662. Fissidens osmundioides. *Hedw. Sp. Musc. t.* 40. *f.* 7-11. Hypnum asplenioides. *Dicks. Crypt. fasc.* 2. *t.* 5. *f.* 5.—*Dill. Musc. t.* 34. *f.* 1.

β. Capsule drooping.

D. tamarindifolium. *Turn. Musc. Hib. p.* 55. D. incurvum. *Mohr.*—Fissidens incurvus. *Schwaegr. Suppl. t.* 49. Fissidens palmatus. *Hedw. St. Cr. v.* 3. *t.* 30. A? Fissidens longifolius. *Bridel?*

Hab. Moist banks and in woods, abundant.

This little plant has the stems from half a line to full an

inch in length, and these are either decumbent, ascendant, or erect. The leaves vary much in their size and figure on the same and on different individuals. In general, the superior ones are the longest and oblongo-lanceolate, the lower are much smaller and almost ovate, the margins mostly bounded by a pellucid line; the nerve is more or less strong, reaching to the point and sometimes a little beyond it, when the leaf becomes apiculate. The colour varies from a deep green through all the intermediate tints to a yellow brown. With regard to their insertion they are truly bifarious, distichous in direction, vertical. The structure of the leaves of this and the remaining species of the section is highly curious, and totally unlike that of any other plant with which we are acquainted. Besides being vertical, their upper half (taking the nerve for the line of separation) is from the base beyond the middle composed of two equal lamellæ, the lower part of which embraces the stem as represented at f. 4. of *D. adiantoides* (Tab. XVI.), and the rest very often embraces a portion of the leaf placed immediately above it.

We have not brought together such a variety of synonyms without a patient examination of specimens, as well as of the respective figures and descriptions. And first we have the authority of our able countryman Mr. Turner for considering the *Dicr. viridulum* of Swartz (the *Fissidens exilis* of Hedwig) the same as the *D. bryoides*. It is only characterized, as Mr. Turner observes, by being almost stemless and in having few and approximate leaves. Mohr says of this, "caule declinato," in opposition to "caule erectiusculo," which is the only difference in his specific character; and those who will be at the trouble to examine various tufts of specimens will see the fallacy of such a mark. Then with regard to *Fissidens osmundioides*, it differs from the more usual appearance of *D. bryoides* exactly as that does from *D. viridulum*. *D. tamarindifolium* (*D. incurvum* Mohr.) we have likewise made a variety; because the only mark of distinction which we can perceive is the curvation of the fruitstalk at its extremity, by which means the capsule becomes drooping, or, as Mohr expresses it, "*subcernua*;" for the degree of curvature is variable, and is sometimes so slight that it would be difficult to determine to which variety it should belong. Nor can we see how the Hedwigian *Fissidens palmatus* is to be distinguished, if it be not that its capsule is itself curved rather than the fruitstalk, and the

beak of the lid is somewhat longer: and with regard to *F. longifolius*, Bridel himself says it is perhaps a variety of *F. palmatus*, although he takes no notice of the curved capsule. In all the varieties the capsule is nearly urceolate, and the lid has a subulate beak. *D. osmundioides* in *Engl. Bot.* is represented much branched, with innovations; a state in which it is found in very wet situations, although Wahlenberg says he has never seen it.

Varieties of *D. bryoides* we have in our possession, gathered by Mungo Park in the interior of Africa; and we scarcely see any decided characters by which the fine species *Fissidens asplenioides* and *F. polypodioides* of Swartz may be distinguished from it.

2. *D. adiantoides*; fruitstalks lateral; perichætial leaves ovate, slightly convolute, pointed. (Tab. XVI.)

D. adiantoides. *Swartz Musc. Suec. p.* 31. *Turn. Musc. Hib. p.* 57. *Moug. et Nestl. n.* 25. Fissidens adiantoides. *Hedw. St. Cr. v.* 3. *t.* 26. Hypnum adiantoides. *Linn. Sp. Pl. p.* 1588. *Engl. Bot. t.* 264. Fissidens taxifolius. β. *Wahl. Lapp.—Dill. Musc. t.* 34. *f.* 3.

Hab. Moist banks, wet pastures, and bogs.

From the last-described species the present differs in being very much larger, frequently two inches long, branched by innovations, especially when growing in wet places, where our larger specimen was gathered by our kind friend Mr. Dalton. The leaves are nearly lanceolate, more or less serrulate at the point; the base of the fruitstalk is surrounded by a remarkable scaly perichætium, whose leaves are very unlike the cauline ones, being ovate, concave, convolute, nerveless, except at the acuminated point, which has a vertical direction. The base of this perichætium is inserted laterally upon the stem of the plant, and always throws out reddish roots, exactly as the following species, from which it differs scarcely in any thing but in the point of insertion of the fruit. The fruitstalks are flexuose, the capsule inclined, and the lid subulate. Wahlenberg considers this as a variety of the following, perhaps not unjustly.

3. *D. taxifolium*; fruitstalks radicular*; perichætial leaves ovate, sheathing, involute, pointed. (Tab. XVI.)

D. taxifolium. *Swartz Musc. Suec. p.* 31. *Turn. Musc. Hib. p.* 56. *Moug. et Nestl. n.* 217. Fissidens taxifolius. *Hedw. Sp. Musc. t.* 39. *f.* 1-5. Hypnum taxifolium. *Linn. Sp. Pl. p.* 1587. *Engl. Bot. t.* 416. *—Dill. Musc. t.* 34. *f.* 2.

* By this word we mean to imply that the fruitstalks are inserted at the very base of the stem among the roots.

Hab. Moist banks.

Plant from one half to three quarters of an inch in height, root thickly tufted, and sending up many stems. Fruit at the very base of the stems and from among the roots; enveloped at the base of the fruitstalk by a scaly perichætium, the leaves of which exactly resemble the last, and which also throws out roots from its base. Is it not possible that on the decay of the fructification this perichætium may become a perfect plant or frond? And may not the perichætium of *D. adiantoides* possess the same property, whence the growth of that plant by frequent innovations? *Fissidens subbasilaris* of Hedwig is hardly to be distinguished from this.

B. *Leaves inserted on all sides of the stem.*

a. *Leaves destitute of a nerve.*

4. *D. glaucum*; stems branched, fastigiate; leaves erecto-patent, ovato-lanceolate, straight, nerveless, entire; capsule ovate, cernuous; lid rostrate. (Tab. XVI.)

D. glaucum. *Hedw. Sp. Musc.—Schwaegr. Suppl. t.* 28. *Turn. Musc. Hib. p.* 73. *Engl. Bot. t.* 2166. *Moug. et Nestl. n.* 23. Bryum glaucum. *Linn. Sp. Pl.—Dill. Musc. t.* 46. *f.* 20. & *t.* 83. *f.* 8.

Hab. On bogs and wet heaths.

This species is remarkable for its having the habit and nerveless reticulated leaves of a *Sphagnum*. The stems vary considerably in length: American specimens are figured by Dillenius, t. lxxxiii. f. 8.; and it appears to be extensively scattered over the globe.

b. *Leaves furnished with a nerve.*

* *Leaves apiculate or piliferous.*

5. *D. latifolium*; stems short; leaves oblong, concave, entire, apiculate or piliferous, capsule erect, ovato-oblong; lid rostrate. (Tab. XVI.)

D. latifolium. *Hedw. St. Cr. v.* 1. *t.* 33. *Turn. Musc. Hib. p.* 79. Bryum piliferum. *Dicks.*—Trichostomum piliferum. *Engl. Bot. t.* 2536.

Hab. Banks in Ireland and Scotland, chiefly in mountainous situations.

Specimens of this plant from Le Jardin on the chain of Mont Blanc, at an elevation of 8000 feet: those from Kamtschatka and those from Greenland agree in having shorter stems, yellower leaves, and pale-coloured narrower capsules than our native specimens; others again, gathered at an elevation of 6000 feet in the Swiss Alps, perfectly ac-

cord with what we have found near the level of the sea in the vicinity of Dublin. The nerve is frequently so far produced beyond the point of the leaf as to render the latter truly piliferous.

* * *Leaves not apiculate.*

† *Nerve very broad.*

6. *D. longifolium*; stems elongated; leaves very long, subulato-setaceous, falcato-secund, serrulate, their nerve very broad; capsule oblongo-ovate, nearly erect; lid rostrate. (Tab. XVI.)

D. longifolium. *Hedw. St. Cr. v. 3. t. 9. Moug. et Nestl. n.* 318. D. flagellare. *Funk.*

Hab. In wet spots on rocks; Ireland.

This species, which may be so easily distinguished from its congeners by its long and falcate leaves furnished with a nerve occupying nearly their whole breadth, has lately been found in Ireland in the county of Wicklow, under dripping rocks at Glenmalur.

7. *D. cerviculatum*; stems short; leaves lanceolato-subulate, entire, sub-secund, their nerve very broad; capsule ovate, subcernuous, strumose; lid rostrate. (Tab. XVI.)

D. cerviculatum. *Hedw. St. Cr. v. 3. t. 37. Turn. Musc. Hib. p.* 64. *Engl. Bot. t.* 1661. D. pusillum. *Hedw. St. Cr. v. 2. t. 29. Engl. Bot. t.* 2491. D. flavidum. *Schwaegr.*—D. uncinatum. *Engl. Bot. t.* 2261.

Hab. On bogs and moist banks.

The stems are very short, and the dense patches have the stramineous colour of those of a *Splachnum*, when growing, as is most frequently the case, on the black rotten soil of turf bogs.

8. *D. flexuosum*; stems nearly simple, rigid; leaves lanceolato-subulate, acuminated, straight; their nerve very broad; fruitstalks flexuose; capsule ovate, striated; lid rostrate. (Tab. XVI.)

D. flexuosum. *Hedw. Sp. Musc. t.* 38. *Turn. Musc. Hib. p.* 74. *Engl. Bot. t.* 1491. *Moug. et Nestl. n.* 123. Bryum immersum. *Dicks.* —Bryum fragile. *Dicks.*—Sphagnum alpinum. *Linn.* (according to Smith.) *Dill. Musc. t.* 47. *f.* 33. & *t.* 32. *f.* 3.

Hab. On turf bogs and wet rocks.

This plant is liable to such variations in size and colour, that many varieties have been pointed out by authors which we have scarcely thought it useful to separate, having seen the plant so often in completely intermediate states. The more common appearance of the plant, and the only one

met with on plains, has very short stems and pale yellow leaves, which are so fragile as generally to be met with broken off, and lying upon the tufts in considerable quantity, looking at first not unlike the dimidiate calyptræ of this genus; and hence the *Br. fragile* of Dickson. The alpine varieties and those found on wet rocks have the stems sometimes a span in length; are generally of a blackish colour, with leaves diaphanous at the points, and rarely producing fructification. The calyptra of this and of its foreign affinities is fringed at the base with long cilia, as represented in *Musc. Hib.*, in the cryptogamic part of Humboldt's *Botany of South America*, and in our figure TAB. XVI., although this singularity in its structure has been generally overlooked by botanists.

†† *Nerve narrow.*

± *Capsule with a struma.*

9. *D. virens*; stems elongated; leaves from a broad sheathing base, subulate, their margins recurved, crisped when dry, pointing in all directions; capsule smooth, oblongo-cylindrical, subcernuous, strumose; lid rostrate. (TAB. XVII.)

D. virens. *Hedw. St. Cr. v.* 3. *t.* 32. *Turn. Musc. Hib. p.* 69. *Engl. Bot. t.* 1462.

HAB. In marshy places, upon mountains.

This is always an alpine plant. British specimens differ from continental ones in having longer points to the leaves, which are entire.

10. *D. strumiferum*; stems elongated; leaves from a broad sheathing base, subulate, entire, their margins plane, crisped when dry, pointing in all directions; capsule furrowed, oblongo-ovate, subcernuous, strumose; lid rostrate. (TAB. XVII.)

D. strumiferum. *Engl. Bot. t.* 2410. *Moug. et Nestl. n.* 125. Fissidens strumifer. *Hedw. St. Cr. v.* 2. *t.* 32. Bryum inclinans. *Dicks.*

HAB. On marshy places in alpine situations.

Except that the margins of the leaves of this species are not recurved as in the preceding, and that the capsule is shorter and furrowed, there is scarcely a mark of distinction to be found between them.

11. *D. falcatum*; stems nearly simple; leaves long, lanceolato-subulate, falcato-secund, nearly entire; capsule ovate, subcernuous, strumose; lid rostrate. (TAB. XVII.)

D. falcatum. *Hedw Sp. Musc. t.* 32 *f.* 1-7. *Engl. Bot. t.* 1989. Bryum longifolium. *Dicks.*

HAB. On alpine rocks.

The present species is so closely allied to *D. heteromallum*, that we are almost tempted to consider it as merely a variety of that plant. However, the struma at the base of the capsule is of a very decided kind, and the leaves are more falcate.

12. *D. Starkii*; stems somewhat branched; leaves lanceolato-subulate, falcato-secund, entire; capsule oblongo-ovate, suberect, strumose; lid rostrate. (TAB. XVII.)

D. Starkii. *Web. et Mohr Fl. Crypt. Germ.—Engl. Bot. t.* 2227. *Schwaegr. Suppl. t.* 46. *Moug. et Nestl. n.* 413.

HAB. On alpine rocks.

The capsules of this species are longer than those of the preceding, to which it bears, we must confess, a very strong resemblance. The figures in *Engl. Bot.* as well as in *Schwaegr. Suppl.* represent the capsules as being longer than those of any specimens we have yet seen.

*+ + Capsule without a struma.*

13. *D. flavescens*; stems branched; leaves long, lanceolate, serrulate, pointing in all directions, crisped when dry; capsules oblong, erect; lid rostrate. (TAB. XVII.)

D. flavescens. *Engl. Bot. t.* 2263. Bryum flavescens. *Dicks.*—D. gracilescens. *Web. et Mohr.—Schwaegr. Suppl. t.* 46.

HAB. On wet sand, under the banks of rocky rivers.

We have some doubt in quoting the synonym of Mohr, as he describes his plant to have longer capsules.

14. *D. squarrosum*; stems somewhat branched; leaves from a broad sheathing base, lanceolate, obtuse, recurved and patent, directed to every side, crisped when dry; capsule ovate, subcernuous; lid rostrate. (TAB. XVII.)

D. squarrosum. *Schrad. Journ. an.* 1802. *Turn. Musc. Hib. p.* 69. *Schwaegr. Suppl. t.* 47. *Engl. Bot. t.* 2004. *Moug. et Nestl. n.* 326. Bryum palustre. *Dicks.—Dill. Musc. t.* 46. *f.* 24.

HAB. In very wet situations among mountains.

The stems vary in length from one to three inches. This is the most squarrose of the British *Dicrana*.

15. *D. pellucidum*; stems branched; leaves lanceolate, their margins slightly undulated, serrated, rather obtuse, pointing in all directions; capsule ovate, subcernuous; lid rostrate. (TAB. XVII.)

D. pellucidum. *Swartz Musc. Suec. p.* 35. *Turn. Musc. Hib. p.* 68. *Engl. Bot. t.* 1346. *Moug. et Nestl. n.* 122. Bryum pellucidum. *Linn. Sp. Pl. p.* 1583. *Dill. Musc. t.* 46. *f.* 23.

Hab. On wet sides of streams and rivers.

The more ovate, short, somewhat truncate and decidedly inclined capsules furnish the principal distinction between this plant and *D. flavescens*.

16. *D. spurium*; stems elongated; leaves fasciculated, concave, erecto-patent, directed to every side, ovate, the superior ones lanceolate, serrulate; capsule oblong, curved; lid rostrate. (Tab. XVII.)

D. spurium. *Hedw. St. Cr. v.* 2. *t.* 30. *Engl. Bot. t.* 2167. *Moug. et Nestl. n.* 319. Bryum spurium. *Dicks.*

Hab. In bogs; Yorkshire. *Mr. Teesdale.* Kinnordy, Scotland. *Mr. Lyell*; always barren.

This singular species, somewhat allied to *D. scoparium*, *D. undulatum*, and the continental *D. Schraderi*, differs from them all in the breadth of the leaves, most of which are ovate, the upper ones being longer and narrower, and serrated at the points. The teeth of the peristome of this as well as some other species of this genus will not always be found to be divided into two segments only; very frequently three divisions are apparent.

17. *D. crispum*; stems short; leaves from a sheathing base setaceous, nearly distichous, flexuoso-recurved, crisped when dry; capsule ovate, erect; lid with a long beak. (Tab. XVII.)

D. crispum. *Hedw. St. Cr. v.* 2. *t.* 33. *Turn. Musc. Hib. p.* 65. *Engl. Bot. t.* 1151. Bryum vaginale. *Dicks.*

Hab. On moist banks.

This species has a strong resemblance to the *D. Schreberianum* of Hedwig, which, however, decidedly differs by its shorter and wider leaves, by its inclined capsule and shorter lid.

18. *D. Scottianum*; stems branched; leaves erecto-patent, directed to every side, subulate, their margins plane, subserrated, crisped when dry; capsule ovato-cylindraceous, nearly erect; lid with a long beak. (Tab. XVIII.)

D. Scottianum. *Turn. Musc. Hib. t.* 6. *f.* 1. D. flagellare. *Engl. Bot. t.* 1977. (not of Hedwig.) D. strictum. *Schwaegr. Suppl. t.* 43. D. montanum. *Hedw. Sp. Musc. t.* 35?

Hab. On rocks in mountainous districts.

This plant differs from Hedwig's *D. flagellare* principally by the direction of the leaves, which in the latter are constantly secund, yet we shall not be surprised if future observations on authentic specimens may prove them to be the same. We can find *D. montanum* Hedw. to differ only

by the smaller size, and perhaps by its somewhat wider capsule; but even in this last particular we find native specimens of our plant to vary. If we may pronounce from Schwaegrichen's figure and description, we should suppose his *D. Hostianum* to be also the same as our plant.

19. *D. polycarpum*; stems branched; leaves patent, directed to every side, lanceolato-subulate, their margins recurved, flexuose, subserrulate, crisped when dry; capsule obovate, subcernuous; lid rostrate. (TAB. XVIII.)

D. polycarpum. *Ehrh. Crypt. No.* 84. (according to Smith.) *Engl. Bot. t.* 2269. *Moug. et Nestl. n.* 414. Fissidens polycarpus. *Hedw. St. Cr. v.* 2. *t.* 31. D. Bruntoni. *Engl. Bot. t.* 2509.

HAB. On rocks.

This plant may at first sight be easily confounded with a small variety of the preceding; viz. *D. montanum* Hedw. It differs however by the leaves being larger and wider, by their less rigid texture, and more particularly by the margins being recurved; besides, in the lid not being above half as long as the capsule, while in the former the lid and capsule are equal to one another. We find upon examination *D. Bruntoni* Engl. Bot. to be only a small variety of our plant. The teeth of the peristome will be found to be irregularly divided.

20. *D. undulatum*; stems elongated; leaves nearly plane, lanceolate, attenuate, serrulate at the points, transversely undulate; capsule cylindraceous, cernuous; lid with a long beak. (TAB. XVIII.)

D. undulatum. *Ehrhart.* (not of Schrader.) *Turn. Musc. Hib. p.* 59. *Engl. Bot. t.* 2260. D. polysetum. *Swartz.—Schwaegr. Suppl. t.* 41.

HAB. In woods, also on rocks.

This species, which was confounded by the older botanists with *D. scoparium*, as well as the foreign *D. Schraderi*, bears the more striking resemblance to the latter, whose property is however to have more obtuse and carinate leaves, with their nerve disappearing before the points. With *D. scoparium* our plant agrees, in having very remarkable perichætia, one of which incloses two, three, and even four fruitstalks:—in some foreign species allied to this we have seen as many as seven. The transverse undulations of the leaves may be perceived on the plant while growing, although this appearance becomes more striking in dried specimens.

21. *D. scoparium*; stems elongated; leaves narrow, subulate,

canaliculate, secund; capsule cylindraceous, arched, cernuous; lid with a long beak. (Tab. XVIII.)

α. *majus*; stems 2 or 3 inches in length, leaves falcato-secund.

D. scoparium. *Hedw.—Schwaegr. Suppl. t.* 42. *Turn. Musc. Hib. p.* 58. *Moug. et Nestl. n.* 120. Bryum scoparium. *Linn.—Engl. Bot. t.* 354. D. majus. *Turn. Musc. Hib. p.* 58. *Engl. Bot. t.* 1490.—*Dill. Musc. t.* 46. *f.* 16.

β. *fuscescens*; half the size of the preceding; leaves subsecund, narrower, somewhat more crisped when dry. D. fuscescens. *Turn. Musc. Hib. p.* 60. *Engl. Bot. t.* 1597. D. congestum. *Schwaegr. Suppl. t.* 42.

Hab. Woods and hedges. β. principally in mountainous countries.

This plant, which is found scattered over various and distant parts of the globe, and which may be met with in the darkest woods as well as in open bogs, is liable to no small degree of variation in size as well as in the direction of the leaves. The larger variety, with more falcate leaves, has been distinguished by the name of *D. majus*; while on the other hand the smaller plant, with leaves scarcely if at all secund, has been called *D. fuscescens*. This last-mentioned variety is scarcely to be known from *D. flagellare* Hedw. but by its more curved and somewhat drooping capsules.

22. *D. varium*; stems short, leaves narrow, hastato-lanceolate, capsule ovate; lid rostrate. (Tab. XVII.)

α. *viride*; leaves pointing in all directions, lanceolate, green; capsules subcernuous.

D. varium. *Hedw. St. Cr. v.* 2. *t.* 34. *Turn. Musc. Hib. p.* 65. *Engl. Bot. t.* 1215. *Moug. et Nestl. n.* 412. D. rigidulum. *Swartz Musc. Suec. t.* 3. *f.* 7. *Hedw. Sp. Musc. t.* 32. D. callistomum. *Smith Fl. Brit.*—Bryum callistomum. *Dicks.*

β. *rufescens*; leaves subsecund, lanceolato-subulate, reddish; capsules erect.

D. rufescens. *Turn. Musc. Hib. p.* 66. *Engl. Bot. t.* 1216. Bryum rufescens. *Dicks.—Dill. Musc. t.* 50. *f.* 59.

γ. *luridum*; leaves subsecund, subulate, of a lurid colour; capsules subcernuous.

Hab. On moist banks.

After an attentive examination of numerous specimens of *D. varium* and *D. rufescens*, we have considered it most prudent to make them varieties; for notwithstanding that *D. varium* in occasional plants has the leaves decidedly falcate, of a greener colour, a firmer texture, with an entire margin, and its capsules inclining; while some individuals of *D. rufescens* have their leaves of a reddish colour, with an evident reticulation, serrated margin, and with erect capsules;—yet we have met with specimens partaking so much

of the characters of both, that it seemed impossible to determine to which they should be referred. Our var. $\gamma$. has leaves still longer than those of *rufescens*, but not serrated, nor so strongly reticulated; with the capsules as in $\alpha$. We cannot find the *D. rigidulum* and *D. callistomum* to differ in any way from our common *D. varium*.

23. *D. heteromallum*; stems branched; leaves subulate, falcato-secund, nearly entire; capsule ovate, subcernuous; lid with a long beak. (Tab. XVIII.)

D. heteromallum. *Hedw. St. Cr. v.* 1. *t.* 26. *Turn. Musc. Hib. p.* 61. *Engl. Bot. t.* 1272. *Moug. et Nestl. n.* 121. D. orthocarpum. *Hedw. Sp. Musc. t.* 30. (according to Mohr.) D. curvatum. *Hedw. Sp. Musc. t.* 31. D. interruptum. *Hedw. Sp. Musc. t.* 29.—*Dill. Musc. t.* 47. *f.* 37 & 38.

Hab. On moist banks.

We have noticed above that this species can scarcely be distinguished from *D. falcatum* and *D. Starkii*, but by the want of the struma at the base of the capsule. Has an alpine situation any effect in producing such a variation?

24. *D. subulatum*; stems branched; leaves from a broad sheathing base subulato-setaceous, secund, entire; capsule ovate, subcernuous; lid with a long beak. (Tab. XVIII.)

D. subulatum. *Hedw. Sp. Musc. t.* 34. *Turn. Musc. Hib. p.* 63. *Engl. Bot. t.* 1273.

Hab. Moist banks.

Perhaps Mohr was right in uniting this species with the preceding one; for we must confess that we can perceive no other differences than the slight ones mentioned in our specific characters.

## 19. TRICHOSTOMUM.

Gen. Char. *Fruitstalks* terminal; *Peristome* of 16 equal teeth divided to the base, or 32 placed together in pairs; *Calyptra* mitriform. (Tab. II.)

We need only repeat here what we have already said under the genus *Grimmia*, that it and the present one are very closely allied both in natural and essential character. *Trichostomum* is to *Didymodon* what *Grimmia* is to *Weissia*.

* *Fruitstalks curved.*

1. *Tr. patens*; stems elongated; leaves lanceolate, acuminated, carinated, their margins recurved; capsule ovate; fruitstalks curved; lid conical. (Tab. XIX.)

Tr. patens. *Schwaegr. Suppl. t.* 37. *Moug. et Nestl. n.* 214. Dicranum patens. *Engl. Bot. t.* 1990. Bryum patens. *Dicks. Crypt. fasc.* 8. *t.* 4. *f.* 8. Fissidens patens. *Wahl. Fl. Lapp.*—Tr. obtusum. *Fl. Brit.*—Tr. funale. *Schwaegr. Suppl. t.* 37?—*Dill. Musc. t.* 17. *f.* 30.

Hab. Scotch, Welsh, and Irish mountains.

It is not without some hesitation that we have ventured to quote under our present plant the *Tr. funale* of Schwaegrichen, which we have received from Ireland from Mr. Templeton. It must however be very apparent upon an inspection of Schwaegrichen's figures that the two only differ by the one having hair-pointed leaves and a striated capsule. Now, not only in our Scotch specimens of *Tr. patens* have we observed the capsule when mature to be furrowed, but Wahlenberg supports us in this observation, as appears in his description of the moss as it is found in Lapland. As to the points of the leaves, these we have found piliferous in specimens which we have collected on the Swiss alps. We have ourselves gathered Dillenius' plant on Snowdon, and compared it with the specimens in his herbarium, and find them to accord entirely with *Tr. patens*. The fruit is apparently lateral from an elongation of the stem.

** *Fruitstalks straight.*

† *Leaves with diaphanous points.*

2. *Tr. lanuginosum*; stems elongated, subpinnate; leaves lanceolato-subulate, acuminate; their long diaphanous points serrated, margins recurved; capsule ovate; fruitstalks short, on lateral branches; lid rostrate. (Tab. XIX.)

Tr. lanuginosum. *Hedw. St. Cr. v.* 3. *t.* 2. *Swartz Musc. Suec.*—*Turn. Musc. Hib. p.* 38. *Engl. Bot. t.* 1348. *Moug. et Nestl. n.* 21. Bryum hypnoides *α. Linn. Sp. Pl.*—*Dill. Musc. t.* 47. *f.* 32.

Hab. On mountains, especially at some considerable elevation. It has likewise been found on the flat heaths in Norfolk by the Rev. *James Layton*.

This species, very common in mountainous countries, can scarcely be mistaken for any of its congeners. The stems are sometimes a foot or more in length, and have an irregularly pinnated appearance; and the fruitstalks, without an attentive observation of the branches on which they stand terminal, may be taken for lateral.

3. *Tr. canescens*; stems elongated, irregularly branched; leaves ovato-lanceolate, their diaphanous acuminated points slightly serrated; capsule ovate; teeth of the peristome very long and filiform; lid subulate. (TAB. XIX.)

Tr. canescens. *Hedw. St. Cr. v.* 3. *t.* 5. *Turn. Musc. Hib. p.* 39. *Engl. Bot. t.* 2534. *Moug. et Nestl. n.* 20. Tr. ericoides. *Schrad.*—*Turn. Musc. Hib. p.* 38. *Engl. Bot. t.* 1991. *Schwaegr. Suppl. t.* 38. *Moug. et Nestl. n.* 409.—*Dill. Musc. t.* 47. *f.* 27. B. & *f.* 31.

HAB. On heaths and in mountainous countries; also on the sea-beach near Yarmouth.

The *Tr. ericoides* of authors has somewhat of a pinnated appearance, arising from numerous very short branches; but in the form of the leaves, capsule, and peristome it perfectly accords with *Tr. canescens*.

4. *Tr. heterostichum*; stems elongated, branched; leaves ovato-lanceolate, their diaphanous acuminated points slightly serrated; capsule oblong, teeth of the peristome rather short; lid rostrate. (TAB. XIX.)

Tr. heterostichum. *Hedw. St. Cr. v.* 2. *t.* 25. *Turn. Musc. Hib. p.* 37. *Engl. Bot. t.* 1347. *Moug. et Nestl. n.* 19. Bryum heterostichum. *Dicks.*—*Dill. Musc. t.* 47. *f.* 27. A. & F. & G.

HAB. On stones in mountainous districts.

It is by no means an easy task to distinguish between this and the preceding species, without an examination of the peristome, where the principal and most important difference certainly lies. The teeth of the fringe in this moss are much shorter, and split after the manner of a *Dicranum*, but nearly to the base; while those of *Tr. canescens* are very long and filiform. The capsule too presents a slight difference, being ovate in *Tr. canescens*, and oblong or cylindraceous in *Tr. heterostichum*.

5. *Tr. microcarpon*; stems elongated, branched; leaves lanceolate, their diaphanous acuminated points slightly serrated; capsule oblong; teeth of the peristome rather short; lid rostrate. (TAB. XIX.)

Tr. microcarpon. *Hedw. Sp. Musc. t.* 23. *f.* 8-12. *Turn. Musc. Hib. p.* 40. *Engl. Bot. t.* 1440. *Moug. et Nestl. n.* 315. Dicranum aciculare *var.* γ. *Turn. Musc. Hib. p.* 67. *Dill. Musc. t.* 47. *f.* 29.

HAB. On rocks.

We have noticed in some specimens the diaphanous appearance at the tops of the leaves quite to vanish, which has induced us to include in our synonyms Mr. Turner's acute-leaved variety of his *Dicranum aciculare*; in other particulars the two plants do not at all differ.

†† *Leaves never diaphanous at their points.*

6. *Tr. aciculare*; stems elongated, branched; leaves lanceolate, obtuse, serrulated at the points, their nerve vanishing before the summit; capsule oblong; lid rostrate. (Tab. XIX.)

Tr. aciculare. *Palisot de Beauvois Prodr. p.* 90. *Moug. et Nestl. n.* 22. *Mohr.*—Dicranum aciculare. *Hedw. St. Cr. v.* 3. *t.* 33. *Turn. Musc. Hib. p.* 67. *Engl. Bot. t.* 1978.—*Dill. Musc. t.* 46. *f.* 25 & 26. B.

Hab. In water, or on very wet rocks and stones.

This has the leaf singularly obtuse. The colour varies from black, as it occurs in alpine rivulets, to yellowish-green, as it is found in less wet situations.

7. *Tr. fasciculare*; stems elongated, branched; leaves lanceolate, entire, their summits never diaphanous; their margins recurved; capsule ovato-oblong; lid rostrate. (Tab. XIX.)

Tr. fasciculare. *Schrader Spicil. p.* 51. *Hedw. Sp. Musc.*—*Turn. Musc. Hib. p.* 39. *Engl. Bot. t.* 2005. *Moug. et Nestl. n.* 215. Bryum lutescens. *Dicks.*—B. hypnoides β. *Linn. Sp. Pl. p.* 1585.—*Dill. Musc. t.* 47. *f.* 28. & *t.* 46. *f.* 26. C.

Hab. On rocks in the mountains.

The acute entire leaves and brighter yellowish-green colour of this plant distinguish it easily from the preceding. The want of the diaphanous serrulate points keeps it apart from *Tr. canescens* and its allies. It is by no means of uncommon occurrence; the stems are from one to three inches long.

8. *Tr. polyphyllum*; stems branched; leaves lanceolato-subulate, their margins recurved, serrated above, very much crisped when dry; capsule oblong; lid rostrate. (Tab. XIX.)

Tr. polyphyllum. *Schwaegr. Suppl. t.* 39. *Turn. Musc. Hib. p.* 35. *t.* 7. *Moug. et Nestl. n.* 410. Dicranum polyphyllum. *Engl. Bot. t.* 1217. Bryum polyphyllum. *Dicks.*—B. cirratum β. *Huds.*—Tr. cirratum. *Smith Fl. Brit.*—*Dill. Musc. t.* 48. *f.* 41.

Hab. Rocks and mountains.

This species may be easily known from the other *Trichostoma* by the greater length and narrowness of the leaves, and by their remarkably crisped appearance when in a dry state. It grows in tufts about an inch in height, and varies in colour from a light straw-yellow to a dark green. The capsules are generally crowded, and the teeth of the peristome connected at the base in filiform pairs.

9. *Tr. ellipticum*; stems short, nearly simple; leaves lanceolate, acuminate, straight, their nerve broad, their margins plane; capsule elliptical; lid rostrate. (Tab. XIX.)

Dicranum ellipticum. *Turn. Musc. Hib. p.* 76. *t.* 6. *Engl. Bot. t.* 1901. *Schwaegr. Suppl. t.* 47.

HAB. Mountain rocks.

The capsules of this moss have a very neat and polished appearance. It may be confounded with *Grimmia ovata*; but, as Mr. Turner, its original discoverer, has rightly observed, the want of the diaphanous points to the leaves will always sufficiently distinguish our present plant. The teeth are broad, often cleft, as in *Dicranum*, but more deeply. The habit is very nearly that of *Grimmia ovata*.

## 20. LEUCODON.

GEN. CHAR. *Fruitstalks* lateral; *Peristome* single, of 32 teeth, closely united in pairs; *Calyptra* dimidiate. (TAB. II.)

We have adopted with much satisfaction Schwaegrichen's new genus *Leucodon*, published in the second part of his valuable Supplement to Hedwig's *Species Muscorum*. The only British species has been occasionally thrown among the *Dicrana*, *Trichostoma*, and *Pterogonia*; from any of which an attentive consideration of the lateral fruit, deeply divided teeth, and dimidiate calyptra will keep its genus distinct. The teeth are very narrow, whitish, and sometimes appear united at their tops; but this appearance may arise from our taking as the subjects of our observations capsules in too young a state; since in specimens which have been gathered fresh from the trees, and in a state where the lid had naturally fallen off, the teeth appeared as deeply divided, and the divisions as separate, filiform, and jointless as in some species of *Didymodon*.

*L. sciuroides*; leaves closely imbricated, ovato-cordate, acuminate, striated; capsule oblong. (TAB. XX.)

L. sciuroides. *Schwaegr. Suppl. pars* 2. *p.* 1. L. Morensis. *Schwaegr. Suppl. pars* 2. *p.* 2. Fissidens sciuroides. *Hedw.*—Dicranum sciuroides. *Swartz.*—*Engl. Bot. t.* 1903. Trichostomum sciuroides. *Mohr.*—Pterogonium sciuroides. *Turn. Musc. Hib. p.* 32.

HAB. Trunks of trees.

Stems long, creeping on the bark of trees. Branches

ascendant, from one to two or three inches in length, simple or branched; often swelling towards the centre, and sharper towards the point, sometimes cylindrical; leaves concave, nerveless, but striated, the margins entire; those of the perichætium long, cylindrical, sheathing, especially the interior ones, which are half as long as the fruitstalk, and closely enveloping it. Fruitstalks lateral, about an inch long; lid rostrate.

We have been obliged to frame such a character as would exclude the *L. canariense* of Schwaegrichen, of which he says the leaves are lanceolato-acuminate, loosely imbricated, and that the capsule is globose. With regard to the *L. Morensis* of the same author (*Hypnum Morense* Schleicher), we have abundant specimens, which we have received from Schleicher himself, and others that we have gathered in Switzerland, and can safely assert that they differ in nothing from the common appearance of our plant, except in having the branches somewhat shorter and more tumid. The "folia octo-faria oblique imbricata" may often be seen as distinctly upon our specimens of *L. sciuroides* as upon *L. Morensis*.

The fructification is very scarce in this country;—fine specimens of it have been gathered by Mr. Lyell in the New Forest.

## 21. DIDYMODON.

Gen. Char. *Fruitstalks* terminal; *Peristome* single, of 16 or 32 teeth approaching in pairs, or united at the base; *Calyptra* dimidiate. (Tab. II.)

In natural habit the plants of this genus approach on the one hand to the *Weissiæ*, and on the other to the *Dicrana*. With the former, two species are liable to be confounded, viz. *Didymodon inclinatum* and *D. heteromallum*, each of which has but sixteen teeth, and their approximation in pairs is with difficulty discoverable. In *D. nervosum* and *purpureum*, besides being united in pairs at the base, we find them connected in various parts of their length by transverse bars; and in *D. nervosum* their direction appears not erect but oblique. In *D. trifarium*

the teeth approximate very closely in pairs, in *D. capillaceum* and *heteromallum* less so: moreover in the latter each tooth has frequently a longitudinal cleft down its centre.

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* *Capsules inclined.*

1. *D. purpureum*; stems scarcely branched; leaves lanceolate, acuminate, carinate, their margins recurved, entire; capsule ovato-cylindraceous, oblique, substrumose, furrowed when dry; lid conical. (Tab. XX.)

Dicranum purpureum. *Hedw. Sp. Musc. t.* 36. *Turn. Musc. Hib. p.* 72. *Engl. Bot. t.* 2262. *Moug. et Nestl. n.* 24. Mnium purpureum. *Linn.*—Bryum bipartitum. *Dicks.*—*Engl. Bot. t.* 2357. Dicranum strictum. *Engl. Bot. t.* 2294. Bryum strictum. *Dicks.*—Dicranum Celsii. *Engl. Bot. t.* 2418. Bryum Celsii. *Linn.*—Trichostomum papillosum. *Engl. Bot. t.* 2533. Bryum tenue. *Dicks.*—D. intermedium. *Hedw. Sp. Musc. t.* 31. *f.* 1-6.

Hab. On the ground and on moist banks.

This plant is abundant in Europe, not being uncommon in the warm parts, though seeming to prefer the colder regions. In Iceland it covers the ground in large patches, as well as in Greenland, whence Professor Giesecke has, among other cryptogamous plants, brought beautiful specimens of this. The synonyms enumerated above can scarcely be doubted to belong to this species. It varies extremely in the length of the stems, but is very constant in the shape of the leaves, of the capsule furnished with a struma, sulcated when dry, and of its conical lid. The teeth of the peristome are so long, so narrow, and deeply divided, as to demand a removal of this plant to the genus *Didymodon*; and indeed Sir James Smith has, from the observations of Mr. Turner, actually described a variety of it in that section of his genus *Trichostomum* which corresponds to the *Didymodon* of Hedwig, under the name of *T. papillosum*.

2. *D. inclinatum*; leaves bifarious, from a sheathing base, subulate; capsule ovate, inclined; lid conical. (Tab. XX.)

Didymodon inclinatum. *Swartz Musc. Suec.*—Bryum inclinatum. *Dicks.*— Swartzia inclinata. *Hedw. St. Cr. v.* 2. *t.* 27. Cynontodium inclinatum. *Hedw. Sp. Musc. p.* 58. Grimmia inclinata. *Engl. Bot. t.* 1824.

Hab. On mountain rocks, rare.

The teeth of the peristome are so broad as to be remarkable in this genus, and to render it doubtful whether it should be arranged as Sir James Smith has done, under his

*Grimmiæ* (the *Weissiæ* of Hedwig), or, as we judge, taking the approximation of the teeth in pairs and the habit of the plant into account, that it should be left where Swartz and Mohr have placed it, under the genus *Didymodon*. It is an exceedingly rare species with us, having, since the time of its discovery by Mr. Dickson, been only met with by Mr. Mackay on the mountains of Cunnamara in Ireland.

** *Capsules erect.*

3. *D. nervosum*; leaves obovate, shortly apiculate, their nerve incrassated above; capsule ovate, erect; lid shortly rostrate. (Tab. XX.)

Grimmia atro-virens. *Engl. Bot. t.* 2015.

Hab. On dry banks, especially in maritime situations.

This species may easily be mistaken for *Weissia lanceolata*, and especially for that variety which has been called *W. aciphylla* by Mohr; but the breadth and stronger texture of the leaf, its remarkable nerve, which is thickened above, and its peristome of 32 teeth approached in pairs, are abundantly characteristic marks. This species has wider leaves than any of its congeners.

4. *D. flexifolium*; stems more or less elongated; leaves oblongo-ovate, flexuose, strongly serrated at the point; capsule erect, cylindraceous; (lid rostrate, *Dicks.*) (Tab. XX.)

Trichostomum flexifolium. *Engl. Bot. t.* 2490. Bryum flexifolium. *Dicks. Plant. Crypt. fasc.* 3. *t.* 7.

Hab. On sterile banks near Croydon. *Mr. Dickson.* Roof of an old barn near Manchester. *Mr. Hobson.*

Stems from half an inch long in fertile plants to two inches in sterile ones; leaves rather succulent, singularly flexuose and crisped, especially at their margins; patent or recurved. Nerve disappearing below the point. The margin at the extremity remarkably serrated; fruitstalks about three quarters of an inch long; perichætial leaves longer than the rest, and convolute. Capsule ovate, cylindraceous, brown, smooth in our specimens, striated in *Engl. Bot.*; lid, according to Dickson, subulate.

It is from Mr. Dickson alone that we have received fructified specimens of this curious moss; but these had no operculum nor peristome, so that the genus remains unknown. The leaves are totally unlike those of any other moss. Mr. Hobson has lately found this plant abundantly near Manchester, but always barren. It grows in thick tufts.

5. *D. rigidulum*; leaves closely imbricated on all sides, lanceolate, much acuminated, carinated, with the rigid nerve running beyond the point; capsule oblongo-ovate, erect; lid rostrate. (Tab. XX.)

D. rigidulum. *Hedw. St. Cr. v.* 3. *t.* 4. Trichostomum rigidulum. *Turn. Musc. Hib. p.* 34. *Engl. Bot. t.* 2178.

Hab. Walls and rocks. Not uncommon in Ireland.

"Habitus omnino *Tortulæ*" Mr. Turner has well observed of this plant; indeed so nearly does it approach to *Tortula fallax* that it will require an experienced eye to distinguish it without having recourse to the peristome. The nerve of the leaf however is different, singularly rigid, of a brown colour (as well as the leaves themselves), and decidedly running out beyond the point of the leaf; thus the stems have a bristly appearance from the stiffness and sharpness of the foliage. Hedwig's figure, we must observe, does not give a correct idea of this plant, which is in reality more different from *D. trifarium* than his representations would lead us to suppose. We do not think, indeed, that any stress can be laid on the operculum, which varies somewhat in length in each species; nor can we consent to their being placed in different genera in consequence of the situation of the supposed male flowers.

6. *D. trifarium*; leaves rather distant, somewhat trifarious, lanceolate, rather obtuse, carinated, with the nerve scarcely reaching to the point; capsule oblongo-ovate, erect; lid rostrate. (Tab. XX)

D. trifarium. *Swartz Musc. Suec.* Swartzia trifaria. *Hedw. St. Cr. v.* 2. *t.* 28. Cynontodium trifarium. *Hedw. Sp. Musc. p.* 57. Trichostomum trifarium. *Engl. Bot. t.* 1707. Tr. linoides. *Engl. Bot. t.* 2295. (not of *Dicks.*)

Hab. On moist banks.

Although very closely allied to the preceding species, this may be known by the shorter, more patent, far less rigid, more distantly placed, and somewhat trifarious leaves. In size it varies considerably, and is often much branched with innovations. Our larger plant is the *Trichostomum linoides* of *Engl. Bot.*; and this is of a much paler colour, as well as larger size, than our smallest figures, taken from specimens gathered by our friend Mr. Drummond, near Cork.

7. *D. capillaceum*; stems elongated; leaves nearly distichous, subulato-setaceous; capsule erect, ovato-cylindraceous; lid conical. (Tab. XX.)

D. capillaceum. *Schrader Spic.—Swartz.—Mohr.*—Swartzia capil-

lacea. *Hedw. St. Cr. v.* 2. *t.* 26. Cynontodium capillaceum. *Hedw. Sp. Musc.*—Trichostomum capillaceum. *Turn. Musc. Hib. p.* 35. *Engl. Bot. t.* 1152.

HAB. On banks in mountainous situations.

This species is most nearly allied to *D. inclinatum*, of all the British mosses, in general appearance. The stems nevertheless are much longer, and the capsule erect and more slender; and when the peristomes are subjected to the microscope they almost seem to belong to different genera, so much narrower are the teeth of the present species. The stems vary exceedingly in length, according as the plant is found in wet or dry situations.

8. *D. heteromallum*; stems rather short; leaves subsecund, subulate; capsule ovato-cylindraceous; lid conical. (TAB. XX.)

Weissia heteromalla. *Hedw. St. Cr. v.* 1. *t.* 8. Grimmia heteromalla. *Engl. Bot. t.* 1899. *Turn. Musc. Hib. p.* 30. Bryum Weissia. *Dicks.*—Didymodon homomallum. *Hedw. Sp. Musc. t.* 23. *f.* 1-7.

HAB. On the earth in mountainous situations.

We cannot avoid considering the *Didymodon homomallum* of Hedwig, Wahlenberg, and Mohr, as not specifically distinct from our *D. heteromallum* (*Weissia heteromalla* of those authors,) although much stress has been laid on the diagnosis by the two latter. Specimens of the former, from the German botanist Ludwig, in Mr. Turner's Herbarium, have the greatest similarity with our plant, differing only in their smaller size, darker colour, and more secund leaves; nor indeed does the figure in Hedwig's *Species Muscorum* (TAB. XXIII.) differ in any essential particular. Thus much for the general appearance of the two plants, the foliage and capsules. In regard to the peristome, we find both to have sixteen long, filiform, occasionally perforated teeth, placed in rather distant pairs, so that their approximation is not very easily discoverable; and hence it has happened that in the figures of what is called *Weissia heteromalla* in Hedwig's *Stirpes*, the teeth are represented at equal distances. Wahlenberg appears to have described, under his *Weissia heteromalla*, a plant different from ours; since he says "rarissimus muscus a paucis botanicis visus;" and again, "abunde differt a *Didymodonte homomallo*, foliis brevibus neutiquam arcuatis, sed tantum leviter versus unum latus spectantibus, basi vaginantibus, atque caule subfiliformi longiore;" characters which do not well accord either with our specimens or with Hedwig's figures. Our plant is re-

markable for its crowded mode of growth, yellow leaves and fruitstalks; the latter becoming redder upwards, especially as the plant advances to maturity.

## 22. FUNARIA.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* double, oblique; the *outer* of 16 teeth, the *inner* of 16 teeth opposite to those of the outer. (TAB. II.)

The genus *Funaria*, although sufficiently characterized by the interior teeth or cilia being oblique, and placed opposite to those of the outer, is further remarkable in these teeth lying horizontally over the mouth of the capsule; and the mouth itself is not situated at the apex of the capsule, but a little below it, as in *Bartramia*. The capsule is obconical or pyriform, somewhat gibbous above, striated when old. The calyptra is mitriform, quadrangular in a young state, much swollen at its base, so as to be ampullaceous when old; the point mucronated. In the male flowers (of Hedwig) the succulent filaments are remarkably clavate, jointed, pellucid, the joints containing greenish granules.

1. *F. hygrometrica*; leaves very concave, ovate, apiculate, entire, nerve excurrent; fruitstalk curved, flexuose. (TAB. XX.)

   Funaria hygrometrica. *Hedw. Sp. Musc. p.* 172. *Turn. Musc. Hib. p.* 105. *Engl. Bot. t.* 342. *Moug. et Nestl. n.* 132. *Hook. in Fl. Lond. ed.* 2. (with a figure.) Mnium hygrometricum. *Linn.*—Koëlreuteria. *Hedw. Fund.—Dill. Musc. t.* 52. *f.* 75.

   HAB. On old walls and buildings, and dry and barren soils, in almost every situation.

   This species has most decidedly marked characters in the apiculate, not acuminate, and entire leaves, and in the flexuose fruitstalk, which possesses a remarkably hygrometric quality.

2. *F. Muhlenbergii*; stems short; leaves concave, ovate, suddenly acuminated, serrated, the nerve disappearing below the point; fruitstalks straight. (TAB. XX.)

   F. Muhlenbergii. *Turn. in Ann. of Bot. v.* 2. *p.* 198. *Engl. Bot. p.* 1498. *Schwaegr. Suppl. t.* 66.

HAB. In subalpine countries, principally among rocks in a calcareous soil.

3. *F. hibernica*; stems elongated, leaves plane, ovato-lanceolate, gradually acuminated, serrated, nerve disappearing below the point; fruitstalks straight. (TAB. XX.)

F. hibernica. *Hook. in Fl. Lond. ed.* 2. (with a figure.) F. Muhlenbergii. *Mohr Fl. Cr. Germ. p.* 380. F. calcarea. *Wahl. in Act. Holm.* 1806. *t.* 4. *f.* 2?

HAB. Roof of a thatched cottage at Blarney near Cork, Ireland. *Mr. Drummond.*

Distinct as this species may appear at first sight from the preceding one, future observations may prove it to be the same. We are certain it is the *F. Muhlenbergii* of Mohr; and Dr. Swartz, judging only from the figure in *Flora Londinensis*, informs us that it is truly the *F. calcarea* of Wahlenberg, a name which it ought to bear if this suggestion prove correct, and if it prove, as Dr. Swartz believes that it will, a legitimate species.

From the *F. Muhlenbergii* of Turner and Schwaegrichen our plant may be known by its much longer stems and fruitstalks, its more distantly placed, longer, plane, and more gradually acuminated leaves.

## 23. ZYGODON.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* double; the *exterior* of 16 teeth approaching in pairs; the *interior* of as many ciliary processes lying horizontally; *Calyptra* dimidiate, smooth. (TAB. III.)

The very singular plant which forms the subject of this genus was called *Bryum* by Dickson; and by Smith *Mnium*, on account of its furrowed capsule. The form of this capsule, and its being erect, correspond well with *Orthotrichum*, with which likewise it has the greatest affinity in its peristome, according to the drawings and observations of Mr. Templeton. To these we have been obliged to have recourse, (not having the opportunity of seeing specimens in a sufficiently good state to examine the peristome,) both for our character and our figure. The character which at once distinguishes this genus from *Orthotrichum* is

its dimidiate calyptra, exactly as *Weissia* is distinguished from *Grimmia*, and *Didymodon* from *Trichostomum*.

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1. *Z. conoideum.* (Tab. XXI.)

Bryum conoideum. *Dicks. Plant. Crypt. fasc.* 4. *t.* 11. *f.* 2. *Turn. Musc. Hib. p.* 112. Mnium conoideum. *Engl. Bot. t.* 1239. Gymnocephalus conoides. *Schwaegr. Suppl. pars* 2. *p.* 87.

Hab. Trunks of trees near Inverary, Scotland. *Mr. Dickson.* Pear-trees at Orange Grove, near Belfast. *Mr. Templeton.* Near Manchester. *Mr. Hobson.*

The stems, as we have seen them on the trees in Mr. Templeton's orchard near Belfast, grow in a tufted manner, like *Gymnostomum viridissimum*, but rarely exceed half an inch in length. Leaves erecto-patent, between ovate and lanceolate, plane or slightly keeled, entire; the nerve reaching to the point. The texture is compact, dotted, exactly as in the leaves of *Gymnostomum viridissimum* and *Hedwigia aquatica.* Fruitstalk terminal, about as long as the stems; capsule ovate, erect, having a slight apophysis at the base, longitudinally striated. Lid rostrate. Peristome, according to Mr. Templeton's remarks, double; the outer consisting of 16 short obtuse teeth approaching in pairs, which at length become recurved; inner, of as many alternating cilia lying horizontally over the mouth of the capsule.

Although this plant seems to be wholly unknown to the Continental botanists, we possess specimens gathered in the South of France and Italy; and we have others, differing from them only in being somewhat larger, which we have received from the Isle of France. Schwaegrichen has united this with *Bryum androgynum*, and formed of them the genus *Gymnocephalus*, from the naked male flowers which he supposed this to possess, but which he would not have done had he known our plant.

## 24. ORTHOTRICHUM.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* double; the *exterior* of 16 teeth approaching in pairs; the *inner* of as many ciliary processes lying horizontally; *Calyptra* mitriform, sulcate, more or less hairy. (TAB. II.)

Two of this genus, viz. *O. decipiens* and *O. anomalum*, have no ciliary processes. *O. striatum* has them of a peculiar shape and beaded appearance, arising completely within the range of the teeth: but we believe in all the remaining species the ciliary processes arise from the same membrane, and exactly from the sides of the teeth, as we have represented at fig. 2 of the figure of the peristome in TAB. II. Nothwithstanding these anomalies of the peristome, no genus of mosses is more natural in habit; and we cannot accord with Mohr, that the difference of the splitting of the base of the calyptra, in one instance in the furrow, in another in the elevation or keel, is by any means of sufficient importance to detach *O. crispum* from the rest of the species.

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* *Peristome without ciliary processes.*

1. *O. anomalum*; leaves lanceolate, erecto-patent; fruitstalks exserted; peristome of eight double teeth; calyptra slightly pilose. (TAB. XXI.)

   O. anomalum. *Hedw. St. Cr. v.* 2. *t.* 37. (magnified peristome incorrect, for which see *Hedw. Fund. v.* 2. *t.* 7. *f.* 35.) *Dicks.—Turn. Musc. Hib. p.* 94. Bryum striatum β. *Linn.—Dill. Musc. t.* 55. *f.* 9.

   HAB. On rocks and walls.

   The stems are scarcely an inch in height, and the fruitstalks are always longer than the leaves; by which circumstance, as well as by the different configuration of the teeth, it differs from *O. cupulatum*. With this even Hedwig appears to have confounded it, having given the magnified figure of the peristome of it in his plate of the present species. In our plant the peristome is arched when moist, and the teeth are inclined or erect (never recurved) when dry.

2. *O. cupulatum*; leaves lanceolate, erecto-patent; capsule nearly sessile; peristome of 16 double teeth; calyptra slightly pilose. (TAB. XXI.)

O. cupulatum. *Hoffm. Fl. Germ. v.* 2. *p.* 26. *Mohr.—Schwaegr. Suppl. t.* 55. O. nudum. *Dicks. Plant. Crypt. fasc.* 4. *t.* 10. *f.* 13. *Turn. Musc. Hib. p.* 97. *Engl. Bot. t.* 1325. O. anomalum. *Engl. Bot. t.* 1423.

Hab. On wood and stones.

The stems in this species are an inch or more in height, much branched. Leaves generally dark green. Capsules nearly immersed in the leaves. The teeth of the peristome, when dry, are erect; when moist they lie flat over the mouth of the capsule, and resemble a horizontal membrane.

*** Peristome with eight ciliary processes.*

3. *O. crispum*; leaves lanceolato-subulate, much crisped when dry; fruitstalks much exserted; capsule striated; peristome with eight ciliary processes; calyptra very pilose. (Tab. XXI.)

O. crispum. *Hedw. St. Cr. v.* 2. *t.* 35? *Dicks.—Turn. Musc. Hib. p.* 93. *Engl. Bot. t.* 996. Neckera ulophylla. *Mohr.* — Bryum striatum β. *Linn.—Dill. Musc. t.* 55. *f.* 11.

Hab. On trees and stones.

This can scarcely be confounded with any British species, having striking characters in its large size, very crisped foliage, and exserted fruitstalks. It is not so easily distinguished from the Continental *O. Ludwigii* of Schwaegr. *Suppl.*, between which and Hedwig's figure, above quoted, we can perceive no essential difference. With regard to Hedwig's plant, Mohr and Schwaegrichen have already observed how incorrectly the peristome is represented. We may add, too, that the capsule is equally so; for with us at least this part, especially when ripe, is evidently striated, as in most of the remaining species of the genus.

The teeth, though apparently only eight, have each of them a dark line of separation down the middle, and each of these divisions is again marked down their centre with a fainter line. The ciliary processes are always eight, filiform, jointed.

4. *O. Hutchinsiæ*; leaves lanceolate, erect, and nearly straight when dry; fruitstalks much exserted; capsule striated; peristome with eight ciliary processes; calyptra very pilose. (Tab. XXI.)

O. Hutchinsiæ. *Engl. Bot. t.* 2523.

Hab. On rocks by the sides of lakes near Bantry. *Miss Hutchins.* Also in the county of Wicklow.

The present species, though it have the capsule, calyptra,

and very nearly the peristome of *O. crispum*, yet differs essentially from it in the leaves, which bear a close resemblance to those of *O. anomalum*, are of the same brownish colour, and nearly as erect when dry as when in a moist state. The fruitstalks, which are quite as much exserted as in the last-described species, are often twisted. The peristome only differs from that of the preceding in having its eight teeth, when recurved, deeply and regularly cleft down the middle.

5. *O. affine*; leaves patent, broadly lanceolate; capsules sessile; peristome with eight ciliary processes; calyptra subpilose. (Tab. XXI.)

*α. majus.* Stems elongated; calyptra, especially above, pilose.

O. affine. *Schrad. Spicil. p.* 67. *Turn. Musc. Hib. p.* 96. *Engl. Bot. t.* 1323. *Schwaegr. Suppl. t.* 49. (under the name of *O. striatum.*) O. rupestre. *Schwaegr. Suppl. t.* 53?—*Dill. Musc. t.* 55. *f.* 10.

*β. pumilum.* Stems very short; calyptra glabrous. O. pumilum. *Swartz Musc. Suec. t.* 4. *f.* 9. *Dicks.—Turn. Musc. Hib. p.* 98. *Engl. Bot. t.* 2168. *Schwaegr. Suppl. t.* 50.

Hab. Trunks of trees and old pales, common.

Since we have been unable to discover any other mark of distinction between *O. affine* and *O. pumilum*, than the smaller size of the latter, and its glabrous calyptra, (which even in the former is at most but slightly pilose,) we cannot do otherwise than look upon them as varieties of the same species. We have quoted doubtfully the *O. rupestre* of Schwaegrichen, in which he has represented the ciliary processes very broad at the base, not filiform, as in our plant.

The stems vary from half an inch, or even less, to an inch or more in height, and are in proportion to their size more or less branched. The peristome consists of eight teeth, marked with three faint longitudinal lines, but we have never seen them split even when recurved. The ciliary processes are always eight.

*** *Peristome with* 16 *ciliary processes.*

6. *O. diaphanum*; stems short; leaves lanceolate, acuminated, their points diaphanous; capsule sessile; peristome with 16 ciliary processes; calyptra subpilose. (Tab. XXI.)

O. diaphanum. *Schrad. Spicil. p.* 69. *Dicks. Pl. Crypt. fasc. t.* 10. *f.* 12. *Turn. Musc. Hib. p.* 99. *f.* 1. *Engl. Bot. t.* 1324. *Schwaegr. Suppl. t.* 55. O. aristatum. *Turn. Musc. Hib. p.* 100. *t.* 9. *f.* 2.

Hab. On trees, walls, roofs, and pales.

An extremely common species, distinguished readily enough by the diaphanous points of the leaves.

7. *O. pulchellum*; stems short; leaves patent, narrow-lanceolate, crisped when dry; fruitstalks exserted; peristome with 16 slender ciliary processes; calyptra subpilose. (Tab XXI.)

O. pulchellum. *Engl. Bot. t.* 1787.

Hab. On trunks of trees.

This species, which seems unknown on the continent, was first distinguished by the late Mr. Brunton, who found it in the north of England. We have collected specimens on the mountains near Dublin, and Mr. Hobson has met with it near Manchester. In size it scarcely exceeds the preceding; but its exserted fruitstalks, lighter colour, and crisped leaves, without the long diaphanous points, afford abundant marks of distinction. The colour of the outer teeth is of a fine red, and very unlike in this particular the rest of the genus.

8. *O. rivulare*; stems elongated, much branched; leaves broadly lanceolate, obtuse; capsules sessile; peristome with 16 slender ciliary processes; calyptra smooth. (Tab. XXI.)

O. rivulare. *Turn. Musc. Hib. p.* 96. *t.* 8. *Engl. Bot. t.* 2188.

Hab. Rocks and streams.

*O. rivulare* vies with *O. striatum* in size, but has the leaves shorter, obtuse, and the ciliary processes of a very different nature, being filiform, and arising from the sides of the teeth. It appears to be unnoticed by the Continental muscologists, though found with us in various parts of the kingdom. The mouth of the capsule is furnished with 16 teeth standing in pairs.

9. *O. striatum*; stems elongated, branched; leaves lanceolate-patent, slightly twisted when dry; capsule sessile, ovate, smooth; peristome with 16 torulose ciliary processes; calyptra subpilose. (Tab. XXI.)

O. striatum. *Hedw. St. Cr. v.* 2. *t.* 36? *Turn. Musc. Hib. p.* 95. (excluding the var. β.) *Engl. Bot. t.* 2187. *Schwaegr. Suppl. t.* 54.

Hab. Usually on trees.

The stems vary considerably in length, and are exceeded by none but those of *O. Lyellii*. The inner fringe is of a very peculiar structure, broad, very pale coloured, and composed of moniliform joints, usually in single rows, but not unfrequently other joints are attached to the sides of these, as represented in our figure. Moreover, these cilia do not arise from the sides of the exterior teeth as in most of the other species, but originate below their sinus, and from a different and an interior membrane, as in *Hypnum*. This configuration does not appear to be accurately represented

by Schwaegrichen in his *Supplement*. Hedwig is particularly unfortunate in his figures of *Orthotricha* in the *Stirpes Cryptogamicæ*. In the present instance the highly magnified capsule in the plate above referred to (*f.* 9, 10.) has a great resemblance to that in the following species, whilst that of the inner fringe agrees in colour with our plant; yet its form is just intermediate, being not sufficiently torulose for *O. striatum*, and too much so for *O. Lyellii*; and the rest of the figures, especially from the exserted fruitstalks, are very different from either of the species now mentioned.

10. *O. Lyellii*; stems elongated, much branched; leaves long, linear-lanceolate, recurvo-patent, much crisped when dry; capsule oblong, striated; peristome with 16, rather broad, distinctly jointed ciliary, processes; calyptra very hairy. (Tab. XXII.)

Hab. On trees in the New Forest, Hants. *Mr. Lyell.*

This fine species, to which we have given the name of its estimable discoverer, has many points in common with *O. striatum*; and yet is at first sight even so easily distinguished by its long narrow and crisped leaves and sessile fruit, that we think no one will hesitate in pronouncing it as decidedly marked a species as any in the genus.

The stems are from two to three and even four inches in length, and are certainly the largest of the family, much branched; with the branches, when growing on the trunks of trees, turned upwards in a dry state, as in *Leucodon sciuroides*. Below they are destitute of foliage in consequence of the plant growing in a crowded manner; above densely clothed with long, linear-lanceolate, recurvo-patent, undulate, and when dry much crisped leaves, whose margins are not (as in almost all the other species) recurved, but, if any thing, rather incurved. Their colour is of a deep yellowish green. On various parts of their surface the *Conferva Orthotrichi* grows in abundance, so that they appear strewed with a brown powdery substance. The fruitstalks are short, wholly immersed in the leaves, as are the capsules for a great portion of their length. These are of an oblong figure, with a remarkably long apophysis, which is smooth, and shrinks much in drying; while the capsule itself is at all times, when ripe, distinctly furrowed; whereas in *O. striatum* it is ovate, and always smooth. Lid shortly rostrate. Peristome; the exterior of 16 long teeth, standing erect when moist, recurved when dry; they are marked

with a central line, and are often cleft at the extremity. Their colour is a pale yellowish brown. That of the inner fringe or cilia is a fine red; their number is 16; they are slightly tapering, and decidedly jointed, but not so moniliform as in the preceding, nor have we ever seen lateral appendages to the joints. Calyptra very hairy, narrower than in *O. striatum*, and all over of the same brown colour.

We are by no means sure that Hedwig, in his figure of the capsule of his *O. striatum*, in his *Stirpes*, has not given that of this species, with which it certainly agrees in the striation, apophysis, and in a great measure in the shape of the ciliary processes. These, however, are represented too moniliform for our plant, yet not enough so for that of *O. striatum*; and the colour is that of the last mentioned.

## 25. NECKERA.

Gen. Char. *Fruitstalks* lateral; *Peristome* double; the *outer* of 16 teeth, the *inner* of 16 cilia, connected only at the very base by a short membrane; *Calyptra* dimidiate. (Tab. III.)

A careful dissection of the inner fringe of either of the species included under this genus will exhibit a peristome very closely resembling that of *Leskea* of Hedwig, from which indeed it must be confessed that *Neckera* is too nearly allied, differing only in having the membrane which unites the cilia at the base so short as scarcely to rise at all above the mouth of the capsule. The same reasons which induce us to unite *Leskea* with *Hypnum* should have prevailed with us to add to them *Neckera* also, if it were not a genus so universally adopted that we do not know of any muscologist who has not kept it distinct. The habit of the British species approaches very nearly to that of *Hypnum trichomanoides* and *Hypnum complanatum*. Like them the leaves are bifarious and distichous.

1. *N. pumila*; leaves ovato-acuminate, slightly concave, their margins recurved; fruitstalks scarcely longer than the perichætial leaves; capsule oblongo-ovate. (Tab. XXII.)

N. pumila. *Hedw. St. Cr. v.* 3. *t.* 20. *Engl. Bot. t.* 1443. *Moug. et Nestl. n.* 429. Hypnum pennatum. *Dicks.*—Fontinalis pennata. *Huds.*

HAB. Woods in Sussex. Very abundant in the New Forest, Hampshire. Rare in Scotland.

This, which is always found upon trees, has been till lately supposed to be confined to the British isles. But it has now been discovered in France, in Switzerland, and in Lapland. In size it is thrice as small as *N. crispa*, and much branched in a pinnated manner, and so much resembling *Hypnum complanatum* that we have received this latter plant with the name of our *Neckera* from various correspondents. The leaves, however, under a microscope will be found of a different figure, and they are slightly undulate, especially when dry. The perichætial leaves are long, very convolute, ovate, much acuminated, and the fruitstalks are but in a slight degree exserted beyond them. The capsules are ovate, a little inclining to cylindrical. *Neckera pennata*, which, though not a native of Britain, is much more abundant on the continent than *N. pumila*, may be known by its larger size, longer and more plane leaves, and above all, by its nearly sessile and wholly immersed capsule.

2. *N. crispa*; leaves oblong, acuminulate, transversely rugose; fruitstalks much exserted; capsule ovate. (TAB. XXII.)

N. crispa. *Hedw. Sp. Musc.—Turn. Musc. Hib. p.* 101. *Moug. et Nestl. n.* 429. Hypnum crispum. *Linn.—Engl. Bot. t.* 617.—*Dill. Musc. t.* 36. *f.* 12.

HAB. On trees and on rocks in subalpine countries, especially in a calcareous soil.

Scarcely any moss can exceed the present in beauty. Its size, being often from 6 to 8 inches in length, its regularly pinnated branches, its large, shining and crisped leaves, have more the appearance of some of the fine tropical mosses than of those of our own country, where it is far from uncommon in the mountainous districts, and frequently covers a great extent of surface upon the trunks of old forest-trees. In this as well as in the preceding species the extremity of the leaves is, under a magnifying power, slightly serrated. The present has the fruitstalks much exserted, in which it differs strikingly from *N. pumila*; and the capsule is ovate approaching to spherical.

## 26. ANOMODON.

GEN. CHAR. *Fruitstalks* lateral; *Peristome* double, consisting of 16 teeth, and a ciliary process arising from each tooth; *Calyptra* dimidiate. (TAB. III.)

Whilst the true *Neckeræ* have the ciliary processes arising from an internal membrane, as in the *Leskeæ* of Hedwig, the two British species now included under the present genus cannot correctly be said to have any internal peristome; the narrow processes corresponding to those of double-fringed mosses arising from the very same range, and by the sides of the teeth, as is the case with most of the *Orthotricha*. Since, however, the species which compose the genus in question have nothing in their habit in common with the genus *Neckera*, with which they have been hitherto united, the argument for keeping together the anomalous species of *Orthotrichum* will not hold good in the present instance; and we have thought it right to bring the two following plants into a genus, which we have called *Anomodon*.

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1. *A. curtipendulum*; leaves ovate, acuminate, serrulate, the nerve disappearing below the point; fruitstalk twice as long as the perichætium; capsule ovate. (TAB. XXII.)

   Neckera curtipendula. *Hedw. Sp. Musc.—Turn. Musc. Hib. p.* 102. *Engl. Bot. t.* 1444. *Moug. et Nestl. n.* 47. Hypnum curtipendulum. *Linn.—Dill. Musc. t.* 43. *f.* 69.

   HAB. Upon the ground, and on rocks and trees. Abundant in mountainous countries. Rare in the plains; and the only station we are acquainted with in the eastern angle of the kingdom is on the sandy Denes near Yarmouth; but it is there always barren.

   There is something very peculiar in the dark, almost blackish green, long, cylindrical, and straggling, though somewhat pinnate stems of this plant. On the wilds of Dartmoor we have gathered them eight or ten inches long, and in a fine state of fructification. The extremities of the branches are slightly incrassated. Leaves imbricated on every side, concave, with a reflexed margin. Those of the perichætium very convolute, almost cuspidate, nerve short.

2. *A. viticulosum*; leaves ovato-lanceolate, obtuse, entire, the

nerve reaching to the point; fruitstalks very long; capsule cylindrical. (Tab. XXII.)

Neckera viticulosa. *Hedw. Sp. Muse. t.* 48. *f.* 4-8. *Turn. Musc. Hib. p.* 103. *Moug. et Nestl. n.* 237. Hypnum viticulosum. *Linn. Sp. Pl. —Engl. Bot. t.* 265.—*Dill. Musc. t.* 39. *f.* 43.

Hab. Upon trees and rocks; less frequently on the ground.

Stems creeping; branches erect, numerous. Leaves imbricated on all sides of the stems, erecto-patent, somewhat undulate, of a thick and soft texture, of a pale green colour, very yellow when old. Perichætium small; its leaves narrower and more concave than the rest; nerve strong. Fruitstalks an inch or more in length. Capsule cylindrical; lid rostrate.

## 27. DALTONIA.

Gen. Char. *Fruitstalks* lateral; *Peristome* double, consisting of 16 teeth, with a ciliary process arising from the side of each; *Calyptra* mitriform. (Tab. III.)

The mitriform calyptra separates this new genus from the preceding, with which the peristome well accords; so that they bear the same relation to each other as *Hookeria* does to *Hypnum*. With much pleasure we here offer our tribute of affectionate regard to our valued friend, the Rev. James Dalton, by whose muscological communications we have frequently profited during the collection of the materials for the present volume.

1. *D. splachnoides*; leaves oblongo-lanceolate; fruitstalks long; calyptra fimbriated at the base. (Tab. XXII.)

Neckera splachnoides. *Engl. Bot. t.* 2564. (not of *Schwaegr.*)

Hab. Secawn mountain, near Dublin. *Dr. Taylor.*

This curious moss has hitherto only been found in the station above mentioned, by the side of a streamlet, where it grows, sparingly, in small pale green tufts. The stems are scarcely more than a quarter of an inch in height, slightly branched, branches erect. Leaves rather loosely imbri-

cated, almost erect, of a delicate nearly membranaceous structure, faintly reticulated, the margins recurved, and somewhat undulate, entire; the nerve reaching almost to the point:—those of the perichætium are few, small, ovate, concave, nerveless. Fruitstalk lateral, about as tall as the stems. Capsule turbinate, with a small apophysis, which gives it the appearance of that of a *Splachnum*, whence the specific name. Calyptra mitriform, with a small cuspidate point; its colour is nearly white; its texture delicate, faintly reticulated; its base cut into a number of fine capillary segments resembling those of *Dicranum flexuosum*. Lid conico-rostrate, about as long as the capsule. Peristome large, the teeth pointing in various directions; the exterior ones reddish brown, the interior pale yellow.

The plant, to which of all others this doubtless bears the closest affinity, is the *Neckera splachnoides* of Schwaegrichen's *Suppl. t.* 82. (*Orthotrichum splachnoides* of Bridel); but that has altogether the peristome of an *Orthotrichum*, having the exterior teeth double, and a dimidiate calyptra.

2. *D. heteromalla*; leaves broadly ovate, acute; capsule sessile, immersed; calyptra nearly entire. (Tab. XXII.)

Neckera heteromalla. *Hedw. St. Cr. v.* 3. *t.* 15. *Turn. Musc. Hib. p.* 102. *Engl. Bot. t.* 1180. Sphagnum arboreum. *Linn.*—Fontinalis secunda. *Dicks.—Dill. Muse. t.* 32. *f.* 6.

Hab. Trunks of trees.

Stems slightly branched, diffuse. Leaves imbricated on every side, concave, with the nerve disappearing below the point, their margins recurved, quite entire. Perichætial leaves as long as the capsule, broadly ovate and suddenly acuminated, almost cuspidate, having a nerve reaching to the point. Capsule sessile. Lid conico-acuminate. Calyptra mitriform, brown, somewhat fringed at the margin.

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## 28. FONTINALIS.

Gen. Char. *Fruitstalks* lateral; *Peristome* double; the *exterior* consisting of 16 teeth; the *inner* of 16 cilia, connected by transverse bars, and forming a reticulated cone; *Calyptra* mitriform. (Tab. III.)

We know of no genus which at all resembles this in the cu-

rious structure of its inner peristome. We speak, however, only of the two first of the following species; for of the third we can say nothing, having never seen the peristome. Its habit and strongly-nerved leaves differ essentially from the two others.

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1. *F. antipyretica*; leaves nerveless, for the most part complicato-carinate. (Tab. XXII.)

F. antipyretica. *Linn. Sp. Pl. p.* 1571. *Turn. Musc. Hib. p.* 199. *Engl. Bot. t.* 859. *Moug et Nestl. n.* 238.—*Dill. Musc. t.* 33. *f.* 1.

Hab. Rivers, alpine streamlets (where it is always small), and stagnant waters; abundant on wood by river banks.

Stems often a foot in length, fluitant. Leaves generally broadly ovate and trifarious, acute, quite entire, not always complicato-carinate; and we have sometimes seen them so plane and so narrow, that it has been scarcely possible to distinguish them from those of *F. squamosa*. Fruit lateral, principally from the lower part of the stems. Perichætium large; its leaves resembling closely imbricated scales; they are of a roundish form, concave, nerveless, frequently erose at their apices from the action of the water. Capsule elliptic; lid conico-acute.

The specific name was given to this plant in allusion to its being employed by the Swedes to fill up the spaces between the chimney and the walls, and thus, by excluding the air, prevent the action of the fire.

2. *F. squamosa*; leaves nerveless, plane, or very slightly concave. (Tab. XXII.)

F. squamosa. *Linn. Sp. Pl. p.* 1571. *Hedw. St. Cr. v.* 3. *t.* 12. *Turn. Musc. Hib. p.* 199. *Engl. Bot. t.* 1861.

Hab. In alpine rivulets of Wales and Scotland. *Dillenius* and *Dickson*.

This appears to be an extremely rare plant; and perhaps other people, as we ourselves have done, have mistaken small varieties of the preceding species for it. Judging from the breadth of the leaves of the *English Botany* figure, we think that even *that* may be nothing more than *F. antipyretica*; and we know that all the specimens we have received from Ireland under the name of *F. squamosa* have been such.

The only specimens we have seen of it, and those are very much injured, are received from Mr. Dickson, and preserved in Mr. Turner's Herbarium. It is extremely slender in its branches, and the leaves are lanceolate, yet so narrow

as when dry almost to appear setaceous. They are plane, or very slightly concave, not carinated, and are imbricated on all sides of the stem. The fruit, though smaller, agrees in every other particular with that of *F. antipyretica*.

Notwithstanding that so many botanists have taken up this species without even expressing a doubt as to its title to rank as such, we cannot help offering it as our opinion that more perfect individuals than we have had the good fortune to see, will prove to have some carinated and conduplicate leaves, and thus bring them to the common alpine state of *F. antipyretica*. Of this we are certain, that all our specimens of *F. squamosa* (as we had fondly hoped them to be), which we had gathered with so much eagerness in the alpine rills of the most elevated mountains of England and Scotland, have turned out upon a more accurate investigation to be the common species.

3. *F. capillacea*; leaves furnished with a nerve, slightly concave. (TAB. XXII.)

F. capillacea. *Dicks. Plant. Cr. fasc.* 2. *p.* 1. *Engl. Bot. t.* 2432.—*Dill. Musc. t.* 33. *f.* 5.

HAB.—Alpine rivulets. *Mr. Dickson.*

With this species we are likewise but little acquainted, having only seen it in Mr. Turner's rich Herbarium, and, like the last described, received from our great cryptogamist Mr. Dickson. In the specimens there preserved the stems are from two to three inches long, but evidently broken, so that they can give no just idea of the length, which Dillenius represents as a span or more, branched. The leaves are subsecund, especially towards the extremity of the branches, of a brownish green colour, long-subulate, concave or a little carinate, furnished with a strong nerve. Perichætium half an inch in length, lateral, arising from the lower part of the stem or branches; its leaves very long and sheathing. No fructification in a more advanced state has been found on Mr. Dickson's Scotch specimens: but Dillenius, whose Pennsylvanian specimens, above referred to, are considered to be the same, thus describes the perichætia and capsules: "e foliorum alis, præsertim qua rami egrediuntur, calyces enascuntur longi, styli instar porrecti, ab initio convoluti et cuspidati, postea in squamas membranaceas oblongas latiusculas pellucidas in summitate dehiscentes, e quibus capsulæ prominent exiguæ, oblongo-rotundæ, operculo cuspidato terminatæ, virides, per maturitatem sub-

fuscæ, exilibus ciliis coronatæ, setis e calyce vix prominulis, per vaginam tamen seu calycem ad basin usque pertingentibus."

Dillenius compares his fine specimens to *Hedwigia aquatica*. Ours have more the slender habit of *Hypnum fluitans*; but the leaves are still longer and narrower.

## 29. BUXBAUMIA.

GEN. CHAR. *Capsule* oblique, gibbous; *Peristome* double; the *exterior* of numerous, filiform, jointless processes; the *interior* a plicate, membranous cone; *Calyptra* mitriform. (TAB. III.)

The only species of this genus has truly a double peristome; but its exterior is totally different from that of any other moss. The processes are slightly torulose but not jointed, of a reddish brown, and of so peculiar a nature that they do not absorb water even when immersed in it for a considerable length of time. For a full history of this genus we must refer our readers to the sixth Number of the New Series of the *Flora Londinensis*.

1. *B. aphylla*. (TAB. XXII.)

B. aphylla. *Linn. Sp. Pl. p.* 1570. *Engl. Bot. t.* 1596. *Hook. in Fl. Lond. ed.* 2. (with a figure.) *Moug. et Nestl. n.* 38.—*Dill. Musc. t.* 68. *f.* 5.

HAB. In a fir-wood at Sprowston, near Norwich.—Near Rosslyn. *Mr. E. Maughan.*—Wood near Aberdeen. *Mr. Jackson.*

This most singular of mosses can scarcely be said to have any stems. The fruitstalks, which are about an inch high, red, and rough with tubercles, arise from a small rough bulb or perichætium, which strikes immediately into the earth its brown entangled roots. Upon the summit of the fruitstalk between it and the capsule, is a short cylindrical apophysis, much narrower than the capsule, and somewhat wider than the fruitstalk. Capsule large, ovate, oblique, flattish above, below convex, at the base gibbous; the mouth has an elevated rim or margin, which is irregularly cleft. The whole

is of a greenish colour, varied with brown, and almost a deep red brown when quite ripe; lid obtusely conical; calyptra of the same shape, but more acuminated.

## 30. BARTRAMIA.

GEN. CHAR. *Fruitstalks* terminal; *Capsule* subglobose; *Peristome* double; the *exterior* of 16 teeth; the *inner* of a membrane divided into 16 bifid segments; *Calyptra* dimidiate. (TAB. III.)

Between the division of the segments of the inner peristome short filiform processes may be observed in all the species except in *B. arcuata*. This genus approaches very nearly to *Bryum*, but has in almost every species a spherical capsule; and the 16 broad segments of the inner peristome, instead of being entire, or only perforated, are cleft like the teeth of a *Dicranum*.

* *Fruitstalks long, straight (not curved).*

1. *B. pomiformis*; leaves patent, subulate, strongly serrated, the nerve reaching to the summit, twisted when dry. (TAB. XXIII.)

*α. minor*; stems shorter, leaves flexuose.

B. pomiformis. *Hedw. Sp. Musc. p.* 164. *Engl. Bot. t.* 998. *Turn. Musc. Hib. p.* 108. *Hook. in Fl. Lond. ed.* 2. (with a figure.) *Schwaegr. Suppl. t.* 68. B. crispa. *Swartz.*—Bryum pomiforme. *Linn.*—B. vulgaris. *Moug. et Nestl. n.* 137.—*Dill. Musc. t.* 44. *f.* 1.

*β. major*; stems much lengthened out, branched; leaves longer, crisped, especially when dry. *Hook. in Fl. Lond. ed.* 2. (with a figure.) B. crispa. *Brid. Musc. v.* 2. *p.* 3. *t.* 1. *f.* 4. *Turn. in Ann. of Bot. v.* 1. *p.* 527. *Engl. Bot. t.* 1526. *Schwaegr. Suppl. t.* 59. B. pomiformis *β.* elongata. *Turn. in Ann. of Bot. v.* 1. *p.* 1526.

HAB. Heaths and dry banks. *β.* principally in subalpine countries.

Of this species the stems are extremely variable, from half an inch to three or four inches in length. In the largest state it becomes the *B. crispa* of many authors; but we must confess that, except in this particular and the longer and more crisped leaves, we perceive no difference between this and the more usual appearance of the plant: hence we

are disposed, as Mohr and the Editor of the last edition of *Flora Londinensis* have done, to consider them only varieties. Schwaegrichen has represented the leaves of the var. *α*. broader and shorter, and less serrated than our specimens exhibit them.

2. *B. ithyphylla*; stems short; leaves rigid, erecto-patent, subulato-setaceous, almost entire; the nerve half way up passing into the substance of the leaf, straight when dry; fruitstalks much elongated. (Tab. XXIII.)

B. ithyphylla. *Brid. Musc. v. 2. t. 1. f. 6. Engl. Bot. t.* 1710. *Schwaegr. Suppl. t.* 60? B. pomiformis. *Swartz.*

Hab. Dry banks in mountainous situations.

The stems are generally about half an inch in length, growing, as in all the species of the genus, in a tufted manner. Its straight and rigid leaves, and their more glaucous colour, will even at first sight distinguish this from the small varieties of *B. pomiformis*; and on a closer examination a still greater difference may be discovered in their structure. They are very narrow, scarcely at all serrated, and only towards the extremity; and what is more remarkable, the nerve, when it reaches about half way from the base, dilates and unites with the substance of the leaf. Hence it becomes thick and rigid, remaining nearly as straight when dry as when wet, which is never the case with the preceding species. This conformation of the leaf is not represented in the figures of Schwaegrichen; and most of those of the plant itself are so much larger than the specimens we have seen, that we cannot help quoting his synonym with a mark of doubt.

3. *B. gracilis*; stems elongated; leaves recurvo-patent, lanceolate, canaliculate, serrated; fruitstalks lateral from innovations. (Tab. XXIII.)

B. gracilis. *Flörke in Schrad. Journ.—Engl. Bot. t.* 1826. B. Œderiana. *Swartz in Schrad. Journ.*—B. Œderi. *Schwaegr. Suppl. t.* 59. *Moug. et Nestl. n.* 326. B. longiseta. *Brid.*—B. grandiflora. *Schwaegr. Suppl. t.* 58.

Hab. Rocks in alpine districts.

This, as do most of the other species of the genus, varies considerably in length, from one to two or even three inches. It is known by its deep colour, its short, patent or recurved and rather distantly placed leaves, and by the fruitstalks, which by the innovations of the stems have a lateral appearance, and scarcely exceed the tops of the branches. *B. longiseta* of Bridel, we believe, is generally allowed to

be the same as our plant; and we are unable to distinguish any essential mark of difference in the American *B. grandiflora* of Schwaegrichen.

4. *B. fontana*; stems fastigiate; leaves closely imbricated, rigid, erect, broadly ovate or lanceolate, acuminated, nearly plane, serrated; fruitstalks lateral from innovations. (Tab. XXIII.)

α. *major*; stems from 3 to 6 inches in length; leaves broadly ovate, acuminate.

B. fontana. *Swartz in Schrad. Journ.—Turn. Musc. Hib. p.* 107. *Moug. et Nestl. n.* 36. Mnium fontanum. *Linn.—Hedw. Sp. Musc.*— Bryum fontanum. *Engl. Bot. t.* 390.—*Dill. Musc. t.* 44. *f.* 2.

β. *marchica*; stems from half an inch to an inch in length; leaves lanceolate, acuminated. B. marchica. *Swartz in Schrad. Journ.*— *Engl. Bot. t.* 2074. Mnium marchicum. *Hedw. St. Cr. v.* 2. *t.* 39. B. fontana β. *pumila. Turn. Musc. Hib. p.* 107. *t.* 10. *f.* 1.

Hab. Wet places in a turfy soil.

Not only do the stems of this species vary much in size, but the leaves also in size and direction; and we have seen specimens, which we have gathered in Switzerland, with leaves as decidedly curved to one side as in *B. falcata* of Hooker in *Linn. Trans.*, whence we are disposed to think that *that* may be only a variety of ours. *B. marchica* we have traced, from its usually small size, up to the true and common *B. fontanum*; and indeed the var. β. of Mr. Turner is so intermediate between the two kinds now mentioned, that we hesitated for some time to which to refer it. We could wish that *B. sphærocarpa* of Hedw., the *B. scabrida*, *B. Muhlenbergii*, and even *B. radicalis* of Schwaegrichen's *Supplement* possessed more decidedly marked characters to distinguish them from our *var. marchica.*

** *Fruitstalks very short, curved.*

5. *B. Halleriana*; stems much elongated, proliferous; leaves long, subulate, flexuose, serrated above; fruitstalks lateral from innovations, very short, curved. (Tab. XXIII.)

B. Halleriana. *Hedw. St. Cr. v.* 2. *t.* 40. *Turn. Musc. Hib. p.* 109. *Engl. Bot. t.* 997. *Moug. et Nestl. n.* 35. Bryum laterale. *Dicks.*

Hab. Moist mountain rocks.

The foliage of this has great affinity with that of *B. pomiformis* β., and the stems vary from two to five and six inches. These however are exceedingly proliferous, throwing off their shoots from the summits, whence the fruit of the two or three preceding years, still remaining on the stems, has the appearance of being lateral. The fruitstalks are very short and curved. Capsules globose, much fur-

rowed. The stems, as in most of the species, are covered with thick, fuscous, downy roots.

6. *B. arcuata*; stems much elongated, proliferous; leaves horizontally patent, ovato-lanceolate, acuminated, serrated, striated; fruitstalks very short, arcuate, at length lateral; capsule smooth. (Tab. XXIII.)

B. arcuata. *Brid. Musc. v. 4. p.* 139. *Engl. Bot. t.* 1237. *Turn. Musc. Hib. p.* 109. *Schwaegr. Suppl. t.* 62. Mnium arcuatum. *Dicks. Plant. Crypt. fasc.* 3. *p.* 2. *t.* 7. *f.* 3. Hypnum chrysocomum. *Dicks. Plant. Crypt. fasc.* 2. *p.* 12.—*Dill. Musc. t.* 39. *f.* 36.

Hab. Mountains of England, Scotland, Wales, and Ireland.—In the greatest abundance upon wet rocks at Lowdore and Keswick.

This extremely beautiful moss, unknown on the Continent of Europe, is rare in most parts of England; yet in the mountainous districts of Ireland is of very common occurrence. It is readily enough known from all the rest of the species by its perfectly globose, large, and smooth capsules, by the greater flexibility of the stems, and rigidity of the leaves, which never become twisted or curled by drying. These leaves approach nearer to those of *B. gracilis*; but they are broader at the base, striated, and of a bright shining yellow-green colour. Schwaegrichen gives the Isle of France, St. Domingo, and Jamaica as stations for this species; the latter on the authority of Swartz's *Mnium tomentosum*, which however we have ascertained to be a different species, having long fruitstalks and capsules, the former upright, the latter deeply sulcate.

## 30. HOOKERIA (*Smith, not Schwaegrichen*).

Gen. Char. *Fruitstalks* lateral; *Peristome* double; the *exterior* of 16 teeth, the *interior* of a membrane divided into 16 entire segments; *Calyptra* mitriform. (Tab. III.)

The only two British individuals of this genus have a peculiarity in their habit, in their plane surculi and bifarious succulent leaves, which seem in themselves to point out a family different from *Hypnum* and *Leskea*, with which they have been

hitherto united; and the mitriform calyptra affords a character which we consider of the highest importance. We are acquainted with several exotic species which agree with them in all these particulars; but we lament that we cannot accord with the learned botanist who established the genus in the ninth volume of the *Linnæan Transactions*, in considering his *H. filiculæformis*, *tamariscina*, *rotulata*, *flabellata*, *Arbuscula*, *flexilis*, and *uncinata*, to accord with it, either in their natural or artificial characters.

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1. *H. lucens*; leaves broadly ovate, entire, obtuse, nerveless. (Tab. XXVII.)

   H. lucens. *Smith in Linn. Trans. v. 9. p. 276. Engl. Bot. t. 1902.* Hypnum lucens. *Linn. Sp. Pl. p. 1589. Hedw. Sp. Musc.—Turn. Musc. Hib. p. 155.—Moug. et Nestl. n. 40.* Leskea lucens. *De Cand. Fl. Gall. Syn.—Schwaegr. Suppl. t. 84.—Dill. Musc. t. 34. f. 10.*

   Hab. Moist banks in woods, and among rocks.

   Stems procumbent, from two to four inches long, slightly branched, plane. Leaves arranged on four sides, but bifarious in their direction, quite plane, of a very succulent texture, reticulated, with the meshes large, the margin not thickened, nerve none. From the points of the leaves roots are often emitted. Fruitstalks about an inch long, curved at the summit. Capsules ovate, horizontal, reticulated; lid conico-rostrate. Calyptra thin, whitish, faintly reticulated, mitriform, jagged at the base. Peristome exactly as in the Hedwigian genus *Leskea*, and as represented by Schwaegrichen and Smith.

2. *H. læte-virens*; leaves ovate, acuminulate, margined, very obscurely serrated at the extremity, with two nerves reaching nearly their whole length. (Tab. XXVII.)

   Hab. Bog near Cork in tolerable plenty, but rare in fruit. *Mr. Drummond.*

   Stems from two to three inches in length, branched in an irregularly pinnated manner, compressed. Leaves arranged on four sides, but bifarious in their direction, ovate, slightly concave, their margin thickened, their point acuminulate, and under a microscope slightly serrated, nerves two to each leaf, standing considerably apart, and running up to more than three fourths of the length of the leaf; reticulation very evident but not so large, nor are the leaves so succulent as in the last species. Fructification as in *H. lucens*.

   Our friend Mr. Drummond had the good fortune to discover this elegant plant, and was so kind as to communicate

specimens to us in the year 1815. No one on examining with the slightest degree of attention its leaves can have any difficulty in distinguishing it from *H. lucens*; and even the whole plant, in its smaller size, brighter green colour and more membranaceous foliage, is sufficiently striking. It is not with the other British species that it can ever be confounded; but with the figure of *Leskea albicans* (an undoubted *Hookeria*) there is so perfect an accordance, that few would venture on pronouncing them different species without as cautious a comparison with authentic specimens as we have ourselves made. In *L. albicans*, however, the colour is very much paler, and has given rise to the specific name; the leaves are of a thinner texture, and furnished with reticulations so very large, that when a leaf of each is seen on the table of a microscope at the same time, a tyro in the science would say that they could not belong to the same species. Moreover in *L. albicans* the margin of the leaf is thicker, and the leaves are much more deeply serrated. In other respects the foliage perfectly accords. But there appears a difference in the operculum, which is shorter in the *L. albicans*, and the calyptra is not only of a different texture, but cleft at the base like the veil of a *Trichostomum* or a *Grimmia*. We are aware how difficult it is to form characters, in a few words, to separate plants so closely allied; and we should not be disposed to differ much from those who, after a due investigation of the characters in each species, might choose to consider them varieties arising from difference of soil and climate; the one being found on the trunks of decaying trees in Jamaica, the other in the cold bogs of Ireland.

There is still another plant which we cannot pass over in silence, since in the form of its leaves, and its two nerves and mitriform calyptra (making it a *Hookeria*), there is the most perfect conformity. We mean the *Leskea depressa* of Swartz and Hedwig, and a native also of Jamaica. But this is a smaller plant; its surculi, though depressed, have not the leaves so decidedly bifarious, nor are these latter nearly so strongly reticulated; their margin is not thickened, nor at all serrated; and the lid of the capsule is shorter.

## 31. HYPNUM.

GEN. CHAR. *Fruitstalks* lateral; *Peristome* double; the *exterior* of 16 teeth; the *interior* of a membrane cut into 16 equal segments, with filiform processes frequently placed between them; *Calyptra* dimidiate. (TAB. III.)

In so extensive a genus as the present we would gladly follow many of the most eminent muscologists in keeping *Leskea* apart from it, were not the characters so difficult to be discovered, and the individuals so closely allied in other respects to the rest of the *Hypna*. The character is, as is well known, founded upon the absence of the filiform processes between the segments of the inner peristome. These indeed vary in number; and some of the real *Hypna* of authors, such as *H. lutescens*, have very short processes, which make them exactly intermediate between *Hypnum* and *Leskea*.

I. *Stems (taken in conjunction with the leaves) plane.*

1. *Capsules erect.*

1. *H. trichomanoides*; leaves broadly scymitar-shaped, serrated at the point, nerve reaching to the middle of the leaf; capsule ovate, erect; lid rostrate. (TAB. XXIV.)

H. trichomanoides. *Schreb. Fl. Lips.—Turn. Musc. Hib. p.* 145. *Engl. Bot. t.* 1493. Leskea trichomanoides. *Hedw.—Moug. et Nestl. n.* 139.—*Dill. Musc. t.* 34. *f.* 8.

HAB. Trunks of trees, not rare.

The remarkable curvature of the leaf, which we have endeavoured to express by the word *scymitar-shaped*, is peculiar to this species of *Hypnum*.

2. *H. complanatum*; leaves oblong, apiculate, entire, nerveless; capsule ovate, erect; lid rostrate. (TAB. XXIV.)

H. complanatum. *Linn. Sp. Pl. p.* 1588. *Turn. Musc. Hib. p.* 144. *Engl. Bot. t.* 1492. Leskea complanata. *Hedw.—Moug. et Nestl. n.* 328.—*Dill. Musc. t.* 34. *f.* 7.

HAB. Trunks of trees, common.

This elegant species as well as the preceding, as we have already intimated, comes very near in habit to the *Neckeræ*, and particularly to *N. pumila*.

2. *Capsules cernuous or inclined.*

3. *H. riparium*; leaves ovato-lanceolate, acuminated, entire, the nerve reaching nearly to the summit; capsules oblong, cernuous; lid conical. (Tab. XXIV.)

H. riparium. *Linn. Sp. Pl. p.* 1595. *Hedw. St. Cr. v.* 4. *t.* 3. *Turn. Musc. Hib. p.* 152. *Engl. Bot. t.* 2060.—*Dill. Musc. t.* 40. *f.* 44. B. C. D.

Hab. Banks of rivers, and in spots occasionally overflowed.

Stems from four to six inches in length. Colour dirty yellow-green.

4. *H. undulatum*; leaves ovate, acute, transversely undulated, with two faint nerves at the base; capsule oblong, furrowed, arcuato-cernuous; lid rostrate. (Tab. XXIV.)

H. undulatum. *Linn. Sp. Pl. p.* 1589. *Turn. Musc. Hib. p.* 154. *Engl. Bot. t.* 1181. *Moug. et Nestl. n.* 45.—*Dill. Musc. t.* 36. *f.* 11.

Hab. In woods and dry heathy places.

This fine species, which is often four or five inches in length, differs most strikingly from the rest of the genus by its peculiar habit, its white membranaceous and undulated leaves; and still more remarkably from all its British congeners by its furrowed capsules, giving it the same relation with the *Hypna* as *Mnium* bears to *Bryum*; and it might with equal propriety be separated.

5. *H. denticulatum*; leaves ovate, sometimes approaching to lanceolate, more or less acuminated, having two short nerves at the base; capsule oblongo-cylindraceous, inclined; lid conical. (Tab. XXIV.)

α. *angustifolium*; leaves ovato-lanceolate, distant, quite plane. H. denticulatum. *Linn. Sp. Pl. p.* 1588. *Hedw. St. Cr. v.* 4. *t.* 31. *Turn. Musc. Hib. p.* 148. *t.* 12. *f.* 1. *Engl. Bot. t.* 1260. *Moug. et Nestl. n.* 46.—*Dill. Musc. t.* 34. *f.* 5, 6.

β. *obtusifolium*; leaves ovate, more or less obtuse, slightly concave. H. denticulatum. β. obtusifolium. *Turn. Musc. Hib. p.* 146. *t.* 12. *f.* 2. H. obtusatum. *Wahl. Fl. Lapp. p.* 371. H. Donnianum. *Engl. Bot. t.* 1446.

Hab. Principally in woods. β. among the mountains.

This species varies extremely in size, somewhat in colour, and greatly in the figure and even in the texture of the leaves. In our α, the most common state of the plant, the leaves are almost exactly distichous, horizontal, narrow and acuminate, so distant as to resemble teeth set along the stem, and better agreeing with the Dillenian figures than with those of Hedwig, which perhaps more properly belong to our β. In this the leaves are broader, more concave and

obtuse, less truly distichous, and their structure is, under the microscope, more reticulated. This is the variety γ. *obtusifolium* of Turner, the *H. obtusatum* of Wahlenberg, and the *H. Donnianum* of Smith. We would gladly follow the two last-mentioned able naturalists in keeping this distinct as a species from α, did we not possess specimens in an intermediate state, both with regard to the form of the leaf, its reticulated structure, and even in the direction of the leaves. All agree in having the same almost cylindraceous inclined capsule and conical lid, and in having a short, forked, or double nerve.

II. *Stems (taken in conjunction with the leaves) more or less cylindrical, never plane.*

1. *Leaves spreading on all sides of the stem* ||.

A. *Leaves uniform in their direction (not squarrose).*

a. *Nerve reaching to or beyond the point.*

* *Leaves without serratures.*

6. *H. medium*; leaves ovate, obtuse, concave, entire, nerve reaching to the summit; capsule cylindrical, nearly erect; lid conical. (Tab. XXIV.)

H. medium. *Dicks. Crypt. fasc.* 2. *p.* 12. *Turn. Musc. Hib. p.* 142. *Engl. Bot. t.* 1274. H. inundatum. *Dicks.—Turn. Musc. Hib.—Engl. Bot. t.* 1922. Leskea polycarpa. *Ehrh. Crypt.—Hedw.—Moug. et Nestl. n.* 224.—*Dill. Musc. t.* 42. *f.* 65. & *t.* 37. *f.* 27. B.

Hab. Trunks of trees, near the ground.

Whole plant much crowded in its growth, of a very lurid colour. Leaves opaque, the margins recurved; in which particular it differs from the *Leskea paludosa* of Hedw. as well as in the nerve, which in the latter disappears before it reaches the point.

7. *H. tenellum*; leaves fasciculate, erect, lanceolato-subulate, entire, their nerve reaching to the summit; capsule ovate, cernuous; lid rostrate. (Tab. XXIV.)

H. tenellum. *Dicks. Crypt. fasc.* 4. *t.* 11. *f.* 12. *Turn. Musc. Hib. p.* 170. *Engl. Bot. t.* 1859. (figure of the leaf bad.)

Hab. On rocks, especially such as are calcareous, and on old walls.

This moss is but little known to Continental writers, as appears by Mohr's observation that it agrees well with

|| In opposition to "leaves secund."

*H. serpens*, and by Schwaegrichen's description, where he says that its nerve reaches only half way up the leaf. From *H. serpens* our plant differs in its mode of growth, its fascicled branches, the shape and texture of the leaves, and rostrate lid. Its nearest affinity is with *H. populeum*, from which it may be known by its narrower, entire leaves, as well as its long operculum. The figure of the leaf in *English Botany* is extremely incorrect, and the nerve is wholly omitted.

8. *H. serpens*; leaves ovato-lanceolate, rather obtuse, patent, entire, their nerve for the most part reaching to the summit; capsule cylindrical, curved, cernuous; lid conical. (Tab. XXIV.)

H. serpens. *Linn. Sp. Pl. p.* 1596. *Turn. Musc. Hib. p.* 168. *Engl. Bot. t.* 1037. *Moug. et Nestl. n.* 332. H. tenue. *Schrad.*—H. contextum & H. spinulosum. *Hedw.*—H. subtile. *Dicks.*—*Turn.*—*Engl. Bot. t.* 2496.—*Dill. Musc. t.* 42. *f.* 64.

Hab. Moist banks, trunks of trees, on pales and decayed wood in various situations.

Schwaegrichen has well observed of this species, "vix datur exemplum tantæ inconstantiæ nervi in ullo Hypno;" for different leaves on the same individual have the nerve varying much in length; yet in the older stems it will generally be found reaching to the point, and of a dark brown colour. It is the almost total disappearance of the nerve in some instances that has caused this plant to be mistaken for the *Leskea subtilis* of Hedwig, which has the true fringe of a *Leskea*, and has not we believe yet been found in Britain. The capsules of *H. subtile* in *English Botany* are figured from foreign specimens. Our own examination of the Dillenian Herbarium does not confirm the opinion of Mr. Turner, that the specimens represented in the *Historia Muscorum*, *t.* 42. *f.* 64. are those of *Leskea subtilis*. We have accordingly referred to that figure under the present plant.

* * *Leaves serrated.*

9. *H. populeum*; leaves lanceolate, acuminated, serrated, margin slightly reflexed, nerve reaching to the point; capsule ovate, nearly erect; fruitstalks rough, lid conical. (Tab. XXIV.)

H. populeum. *Hedw. Sp. Musc. t.* 70. *f.* 1-6. H. implexum. *Swartz.*—*Turn. Musc. Hib. p.* 173. *t.* 16. *Engl. Bot. t.* 1584.

Hab. On trees and rocks.

Mohr appears to us rightly to have united the *Hypnum implexum* of Swartz and Turner to the Hedwigian *H. populeum*. *H. Starkii* of Schleicher's Catalogue, if we may judge from specimens sent by that botanist to Mr. Turner, differs in no particular from our plant; while Mohr describes his species under that name as having a cordate base to the leaves, and an evanescent nerve.

0. *H. reflexum*; leaves cordato-acuminate, serrated, their nerve reaching to the point, their margin slightly reflexed; capsule ovate, cernuous; fruitstalks rough; lid conical. (Tab. XXIV.)

H. reflexum. *Weber et Mohr Fl. Crypt. Germ. p.* 306 & 476. *Schwaegr. Suppl. p.* 269.

Hab. On Ben Nevis, near the base of the mountain.

We have compared our plants with those of the original discoverer, Mr. Starke, and find them to agree in every particular. Its habit is very different from that of the preceding; it is more straggling in its mode of growth, and the leaves are broader and shorter, especially those of the main stem, which are widely cordate with a suddenly acuminated point.

b. *Nerve shorter than the leaf, or none.*

* *Leaves entire.*

† *Leaves ovate or elliptical.*

1. *H. molle*; leaves loosely imbricated, rotundato-ovate, obtuse, concave, entire, faintly two-nerved at the base, or with one short nerve; capsule ovate, cernuous; lid conical. (Tab. XXIV.)

H. molle. *Dicks. Pl. Crypt. fasc.* 2. *t.* 5. *f.* 8. *Hedw. Sp. Musc. t.* 70. *f.* 7-10. *Engl. Bot. t.* 1992. H. alpestre. *Swartz Musc. Suec. p.* 63. *t.* 6. *f.* 15. *Hedw. Sp. Musc. t.* 64. *f.* 1-4.

Hab. Alpine rivulets in Scotland.

This plant, usually, is found from two to three inches in length, much tufted, and consequently with the branches often erect, and bare of leaves at the base. Leaves of a thin membranaceous texture, very dark lurid green colour, concave, varying in the nerve, which is either single or double. Swartz's plant (*H. alpestre*) is certainly of a more rigid texture, the leaves are more patent, and the nerve is more evident in general, the colour is yellower at the extremities of the branches; yet we cannot look upon it otherwise than as the same species: and Mohr's *H. trifarium*,

which Schwaegrichen has made a variety of *H. stramineum*, seems to differ only in its larger size, narrower leaf, and longer nerve. On the other hand, Schleicher's *H. uliginosum*, which Mohr allows to be his *H. trifarium*, exactly corresponds with our plant.

12. *H. Schreberi*; leaves closely imbricated, nearly erect, elliptical, apiculate, concave, entire, faintly two-nerved at the base; capsule ovate, cernuous; lid conical. (Tab. XXIV.)

H. Schreberi. *Willd. Fl. Berol. p.* 325. *Dicks.—Turn. Musc. Hib. p.* 176. *Engl. Bot. t.* 1621. H. purum. *Ehrh.*—H. compressum. *Schreb.*—H. muticum. *Swartz.—Moug. et Nestl. n.* 43.—*Dill. Musc. t.* 40. *f.* 47.

Hab. Woods and banks among bushes.

This species has been confounded with *H. purum*, but it is a longer, more slender and compressed species; the stalks are always of a fine reddish tint; the leaves have a very faint and short double nerve, and are of a brighter yellow-green colour.

13. *H. moniliforme*; leaves closely imbricated, rotundato-ovate, obtuse, very concave, ventricose, nerveless; capsule-ovate, nearly erect. (Tab. XXIV.)

H. moniliforme. *Wahl. Fl. Lapp. p.* 376. *t.* 24. Leskea julacea. *Mohr.*—Hypnum julaceum. *Schwaegr. Suppl. t.* 89. Pterogonium? rotundifolium. *Engl. Bot. t.* 2525.

Hab. On the ground, among mosses, in the south of Ireland. *Mr. Mackay.*

This very curious plant, so nearly resembling in specific character *H. molle*, is very distinct from it as well as from every other known *Hypnum*, scarcely exceeding an inch in length; and having leaves so closely imbricated and so concave as to resemble *Bryum argenteum*, or *Br. Zierii*. The colour is a pale yellow-green. The perichætial leaves of a reddish brown, lanceolate, nerveless. Fruitstalk about an inch long. Capsule erect; lid conical. With us it has not been found in fructification; but we have fine specimens in that state from Switzerland, from which our figure and description were taken. Sir James Smith, who had never seen the capsules, was perfectly correct in stating his doubts as to his plant being a *Pterogonium*. Wahlenberg, who first described and figured this species, originally called it *Leskea julacea*, but changed the specific name to the scarcely less applicable one here adopted.

14. *H. catenulatum*; leaves subpatent, ovate, subacuminated, papillose on the back and margin, with a very short nerve;

capsule ovate, inclined; lid conical, acuminated. (Tab. XXIV.)

H. catenulatum. *Schwaegr. Suppl. p.* 218. Pterigynandrum catenulatum. *Brid. Musc. p.* 64. *t.* 5. *f.* 4. Grimmia catenulata. *Mohr.*

Hab. Wet rocks at the Dargle, and at Powerscourt, near Dublin, abundant.

We think we are perfectly right in considering this plant, —which we have seen in various collections, and which we suspect to be figured in *English Botany* || for *Pterogonium filiforme*,—to be the true *H. catenulatum* of Schwaegrichen. This is truly a *Hypnum*, having a single filiform process between the segments of the inner peristome, as Wahlenberg has represented in his *H. moniliforme*. The stems are closely tufted, from one to two inches in length, rigid; leaves rather distant, of a dark green colour, their margins appearing as it were serrated from the papillose surface. In our specimens the nerve is short, not more than one fourth of the length of the leaf, whilst in the *H. catenulatum* of Schwaegrichen it is said to disappear beyond the middle,—the only difference we can discover.

15. *H. stramineum*; leaves loosely imbricated, erecto-patent, oblongo-ovate, obtuse, entire; their nerve reaching half way; capsule oblongo-ovate, curved, cernuous; lid conical. (Tab. XXIV.)

H. stramineum. *Dicks. Pl. Crypt. fasc.* 1. *t.* 1. *f.* 9. *Turn. Musc. Hib. p.* 164. *Engl. Bot. t.* 2405. *Schwaegr. Suppl. t.* 89. (var. β.)

Hab. Banks and wet bogs, generally mixed with other mosses.

The slender habit, pale colour and obtuse leaves are striking characters in this species. It is incorrectly described in *Fl. Brit.* and in *Engl. Bot.* as having the leaves destitute of a nerve. Schwaegrichen's *var.* β., above quoted, seems just intermediate between our plant and *H. molle*; but the nerve of the leaf is rather that of *stramineum*. The fructification is rare. We find it in that state near Dublin, in July, with the lower part of the fruitstalks buried two inches in a firm sand bank, so that it is scarcely possible to secure good specimens.

16. *H. murale*; leaves nearly erect, imbricated, oval, with a very short point, concave, entire, nerve reaching about half way up; capsule ovate, cernuous; lid rostrate. (Tab. XXIV.)

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|| We mean the specimens received from Mr. Mackay.

H. murale. *Hedw. St. Cr. v.* 4. *t.* 30. *Dicks.* — *Turn. Musc. Hib. p.* 166. *Moug. et Nestl. n.* 145. H. confertum. *Engl. Bot. t.* 1038. H. abbreviatum. *Hedw. Sp. Musc. t.* 65. *f.* 1-4.—*Dill. Musc. t.* 41. *f.* 52.

HAB. On walls and stones.

The rostrate lid and concave, shortly pointed leaves well distinguish this species from its affinities.

17. *H. purum*; leaves closely imbricated, oval, with a very short point, very concave, their nerve reaching half way up; capsule ovate, cernuous, lid conical. (TAB. XXIV.)

H. purum. *Linn. Sp. Pl. p.* 1594. *Hedw. Sp. Musc. t.* 66. *f.* 3-6. *Turn. Musc. Hib. p.* 175. *Engl. Bot. t.* 1599. *Moug. et Nestl. n.* 44. H. illecebrum. *Smith Fl. Brit.* and *Engl. Bot. t.* 2189. (not of *Hedw.*) —*Dill. Musc. t.* 40. *f.* 45.

The less regularly pinnate state of this plant has been taken by English authors for the *H. illecebrum* of Hedwig, an American plant, and a distinct species; having leaves with more acuminated and serrated points, and a longer and more decided nerve.

†† *Leaves lanceolate or subulate.*

← *Leaves without striæ.*

18. *H. fluitans*; leaves loosely imbricated, the upper ones falcato-secund, all of them lanceolato-subulate, scarcely serrated at their points; their nerve reaching more than half way; capsule ovato-oblong, curved, cernuous, lid conical. (TAB. XXIV.)

H. fluitans. *Linn. Fl. Suec. ed.* 2. *p.* 399. *Hedw. St. Cr. v.* 4. *t.* 36. *Turn. Musc. Hib. p.* 182. *Engl. Bot. t.* 1448.—*Dill. Musc. t.* 38. *f.* 33.

HAB. In pools and streams of water; rarely fructifying but in places that are only occasionally inundated.

Stems often a span long. Colour varying from a pale green to a deep purple in alpine rivulets. It is almost doubtful under which section this species should be arranged, as it might with equal propriety have come under that with the "*leaves falcato-secund*," where indeed Mohr has already placed it.

19. *H. plumosum*; leaves erecto-patent, the upper ones sometimes secund, all of them ovato-lanceolate, acuminated, subserrated, the nerve reaching above half way; capsule ovate, cernuous; lid conical. (TAB. XXV.)

H. plumosum. *Linn. Sp. Pl. p.* 1592. (not of *Hedw.*) *Turn. Musc. Hib. p.* 172. *t.* 15. *f.* 1. *Engl. Bot. t.* 2071. H. pseudo-plumosum. *Brid.*—H. alpinum. *Turn. Musc. Hib. p.* 192. *Engl. Bot. t.* 1496. H. flagellare. *Hedw. Sp. Musc. t.* 73. *f.* 1-3. (not of *Dicks.*)

In this species likewise the upper leaves are often secund. All of them are of a glossy, generally deep yellow green. Hedwig's *plumosum* (now called by authors *H. salebrosum*) has striated leaves; and the whole plant so nearly resembles (as Mr. Turner has observed) *H. lutescens*, that we know of no character by which it may be distinguished from it, except the smoothness of its fruitstalks. Specimens of Hedwig's *H. flagellare* perfectly accord with *H. plumosum*, and *H. alpinum* is not to be distinguished from it.

20. *H. pulchellum;* leaves loosely imbricated, the upper ones subsecund, all of them lanceolato-acuminate, entire, nerveless; capsules ovato-cylindrical, nearly erect; lid conical. (Tab. XXV.)

H. pulchellum. *Dicks. Pl. Crypt. fasc.* 2. *t.* 5. *f.* 6. (the leaf is incorrectly represented with a nerve.) *Turn. Musc. Hib. p.* 136. *Engl. Bot. t.* 2006. H. nitidulum. *Wahl.*—Leskea pulchella. *Hedw. Sp. Musc. t.* 55. *f.* 7-12.

Hab. Woods in alpine countries and among rocks.

This is a small species, rarely exceeding an inch in length; the leaves standing out nearly horizontally on each side of the stem, on which account Wahlenberg has brought it into his division with "*shoots plane*;" but then the upper leaves are subsecund; and from this circumstance and the general habit of the plant it approaches very near to that variety of *H. cupressiforme* which by the British botanist has been called *H. polyanthos*, (not *Leskea polyanthos* Hedw.,) and which is probably the same as the *Hypnum incurvatum* of Schrader. From this indeed Schwaegrichen warns us to distinguish our plant: "Differt," he says, "a sequente (*H. incurvato*) operculo brevi, theca subcylindrica ascendente et colore pallido." Wahlenberg, on the other hand, says it is closely allied to *H. denticulatum*. This must not be confounded with the *H. pulchellum of* Hedwig, which is now called *H. strigosum*.

\+ \+ *Leaves striated.*

21. *H. rufescens*; leaves erecto-patent, lanceolate, acuminated, entire, striated, faintly two-nerved at the base; capsule ovate, nearly erect; lid conical. (Tab. XXV.)

H. rufescens. *Dicks. Pl. Crypt. fasc.* 3. *t.* 8. *f.* 4. *Engl. Bot. t.* 2296. Leskea rufescens. *Schwaegr. Suppl. t.* 88.

Hab. Scotch alps, but rare.

Of this very beautiful moss the stems are from 3 to 4 or 5 inches long, erect, and the whole plant of a yellowish

purple colour. In Britain we believe the fruit to be very rare, but it is common among calcareous rocks on the Swiss alps.

22. *H. sericeum*; leaves erecto-patent, lanceolate, acuminated, entire, striated, nerve running to three-fourths of the length; capsule ovato-cylindrical, erect; lid conical. (TAB. XXV.)

H. sericeum. *Linn. Sp. Pl. p.* 1595. *Turn. Musc. Hib. p.* 138. *Engl. Bot. t.* 1445. Leskea sericea. *Hedw. St. Cr. v.* 4. *t.* 17. *Moug. et Nestl. n.* 225.—*Dill. Musc. t.* 42. *f.* 59.

HAB. On trunks of trees, walls and rocks.

Stems creeping; branches numerous, erect.

23. *H. lutescens*; leaves erecto-patent, lanceolate, acuminated, entire, striated, nerve disappearing below the point; capsule ovate, cernuous; fruitstalks rough; lid conico-acuminated. (TAB. XXV.)

H. lutescens. *Huds. Angl. ed.* 1. *p.* 421. *Hedw. St. Cr. v.* 4. *t.* 16. *Turn. Musc. Hib. p.* 174. *Engl. Bot. t.* 1301. *Moug. et Nestl. n.* 334.

HAB. Banks and stems of trees and bushes near the ground, common.

Stems much branched, branches spreading. Leaves sometimes slightly serrulated under a microscope, of a bright yellow green colour. We have already observed how nearly this species is allied to *H. salebrosum* of Mohr, (*H. plumosum* Hedw.) in so much that they who have considered them to be distinct can discover no other character by which they can be known, except the smooth fruitstalk and somewhat shorter lid of the latter. The inner peristome has been figured by Mr. Sowerby as that of a *Leskea*; but in all the specimens that we have examined there may be observed short, filiform processes between each segment of the inner peristome which constitute it a true *Hypnum*. We have received a specimen from Mr. Hobson of Manchester, unfortunately destitute of lids to the capsules, without which we can find no discriminating character but the smooth fruitstalks to keep it distinct from our plant. This is surely the *H. salebrosum* of Mohr, and *plumosum* of Hedw.; and it appears to be a closely connecting link between *H. lutescens* and *H. nitens*.

24. *H. nitens*; leaves erecto-patent, narrow, lanceolate, acuminated, nearly entire, striated, nerve running nearly to the summit; capsule oblongo-ovate, curved, cernuous; fruitstalks smooth; lid conical. (TAB. XXV.)

H. nitens. *Schreb. Fl. Lips. p.* 92. *Hedw.*—*Engl. Bot. t.* 1646.—*Dill. Musc. t.* 39. *f.* 37.

HAB. Bogs in Scotland. *Mr. Dickson.* Near Acle, Nor

folk. *Mr. Turner.* Marshy ground between Copgrove and the river Ure, Yorkshire. *Rev. James Dalton.*

Dillenius did not know this fine moss as British. We are indebted for the discovery of it to Mr. Dickson, and to Mr. Dalton for specimens with perfect capsules. It approaches very nearly to the last-mentioned species, but differs by its larger size, more upright and pinnate mode of growth, orange-brown colour, shorter lid, and longer capsule.

25. *H. albicans*; leaves erecto-patent, ovato-lanceolate, acuminated, striated, entire, nerve reaching half way up; capsules ovate, cernuous; fruitstalks smooth; lid conical. (Tab. XXV.)

H. albicans. *Neck. Meth. Muse. p.* 180. *Hedw. St. Cr. v.* 4. *t.* 5. *Turn. Muse. Hib. p.* 171. *Engl. Bot. t.* 1300.—*Dill. Muse. t.* 42. *f.* 63.

This plant is of a much paler colour than *H. lutescens*, much less branched, and more upright in its growth: yet we must confess that the characters of these two, of *H. nitens* and of *H. salebrosum*, approach so nearly to one another as to render the discrimination between them a most difficult task; nor should we be surprised to find that future observations prove them to be varieties of the same species produced by different circumstances of growth.

### ** *Leaves serrated.*

#### † *Stems below bare of leaves.*

26. *H. alopecurum*; stems erect, below simple and naked, fascicled above; leaves concave, ovate, elliptical, acute, serrated, nerve running nearly to the point, margin reflexed; capsule ovate, cernuous; lid rostrate. (Tab. XXV.)

H. alopecurum. *Linn. Sp. Pl. p.* 1594. *Turn. Muse. Hib. p.* 163. *Engl. Bot. t.* 1182. *Moug. et Nestl. n.* 144.—*Dill. Muse. t.* 41. *f.* 49.

Hab. Woods and shaded banks, common.

This and the following, which are amongst the largest of our *Hypna*, resemble several species from New Holland in their upright stems, almost naked below, and thickly fascicled branches at the summit. A variety of our plant, growing in running water, departs from this appearance in being branched from the very base, with the branches more elongated, and having the leaves more closely set, and shorter.

27. *H. dendroides*; stems erect, below simple and naked, fascicled above; leaves ovate, often more or less lanceolate, striated, serrated at the point, nerve reaching nearly to the summit; capsule erect, ovato-cylindrical; lid rostrate. (Tab. XXV.)

H. dendroides. *Linn. Sp. Pl. p.* 1593. *Turn. Musc. Hib. p.* 138. *Engl. Bot. t.* 1565. Leskea dendroides. *Hedw. Sp. Musc.*—*Wahl.*—Neckera dendroides. *Swartz.*—Climacium dendroides. *Mohr.*—*Moug. et Nestl. n.* 138. *Schwaegr. Suppl. t.* 81.—*Dill. Musc. t.* 40. *f.* 48.

Hab. Woods. Rare in fructification; but found most abundantly in that state by *Mr. Hobson* near Manchester.

The columella is produced, and reaches the top of the lid, which, when the capsules are ripe, and in a dry state of the atmosphere, it raises up, turning in a spiral manner, and thus perhaps permitting the discharge of the seeds. If in this state moisture be applied to the mouth of the capsule, the lid on the top of the columella will descend, as this last performs a spiral volution, and the capsule becomes completely closed again. The segments of the interior peristome being cleft at the base has induced Weber and Mohr to make a distinct genus of it.

### †† *Stems below leafy.*

#### + *Capsules erect.*

28. *H. curvatum*; branches fascicled, curved; leaves ovato-elliptical, concave, serrated at the points, nerve disappearing beyond the middle; capsule ovate, erect; lid rostrate (Tab. XXV.)

H. curvatum. *Swartz Musc. Suec. p.* 64. *Turn. Musc. Suec. p.* 13 *Engl. Bot. t.* 1566. *Moug. et Nestl. n.* 331. H. myosuroides. *Hedw St. Cr. v.* 4. *t.* 8.—*Dill. Musc. t.* 41. *f.* 50.

Hab. On trees and rocks.

The nerve is, as Mohr has justly observed, sometimes forked. In habit it somewhat resembles the two last, but is considerably smaller, and the stems are leafy throughout.

29. *H. myosuroides*; branches fascicled, curved; leaves lanceolato-acuminate, serrated, margins reflexed at the base, their nerve disappearing near the middle; capsule ovato-cylindrical, erect; lid rostrate. (Tab. XXV.)

H. myosuroides. *Linn. Sp. Pl. p.* 1596. (not of *Hedw.*) *Turn. Musc Hib. p.* 140. *Engl. Bot. t.* 1567. *Moug. et Nestl. n.* 330.—*Dill. Musc t.* 41. *f.* 51.

Hab. On trunks of trees and rocks, especially such as are calcareous.

This can only be confounded with the preceding species but its more slender habit, its leaves more acuminated, less concave, with their shorter nerve, reflexed margins, serrated nearly their whole length, will ever keep it distinct.

*+ + Capsules cernuous.*

§ *Stems bi-tripinnate.*

30. *H. splendens*; stems tripinnate; leaves ovate, with a suddenly acuminated, serrated point, concave, faintly two-nerved at the base, margin below recurved; capsule ovate, cernuous, lid rostrate. (Tab. XXV.)

H. splendens. *Hedw. Sp. Musc. t.* 67. *f.* 7-9. *Turn. Musc. Hib. p.* 156. *Engl. Bot. t.* 1424. *Moug. et Nestl. n.* 42. H. parietinum. *Swartz.—Dill. Musc. t.* 35. *f.* 13.

Hab. Heaths and hedge-banks and in woods.

Whole plant glossy, whence its specific name. It has much affinity with the *H. umbratum* of Ehrh. and Hedw. (but not of British authors) in its ramification. This last, although so common on the Continent, has never been found in Britain, and may readily enough be distinguished from our present plant by its cordato-triangular leaves and conical lid.

31. *H. proliferum*; stems tripinnate; leaves serrated, papillose on the back, the cauline ones cordato-acuminate, striated, with a nerve running nearly to the point; those of the branches more ovate, with a single or double nerve at the base. (Tab. XXV.)

H. proliferum. *Linn. Sp. Pl. p.* 1590. *Turn. Musc. Hib. p.* 156. *Engl. Bot. t.* 1494. H. tamariscinum. *Hedw. St. Cr. v.* 4. *t.* 3. *Moug. et Nestl. n.* 41. H. recognitum. *Hedw. Sp. Musc. t.* 67. *f.* 1-5. H. delicatulum. *Hedw. St. Cr. v.* 4. *t.* 35. H. parietinum. *Willd.—Dill. Musc. t.* 35. *f.* 14. & 38. *f.* 6.

Hab. Woods and banks in heathy places, abundant.

Stems reddish. Leaves yellowish green, dull and opaque. It has been found in every part of Europe; as well as in Jamaica, New Holland, and on the mountains of Nepaul.

32. *H. prælongum*; stems subbipinnate; leaves distantly placed, patent, cordate or ovate, acuminated, serrated, nerve disappearing below the summit; capsule ovate, cernuous; lid rostrate. (Tab. XXV.)

H. prælongum. *Linn. Sp. Pl. p.* 1591. *Hedw. St. Cr. v.* 4. *t.* 29. *Turn. Musc. Hib. p.* 160. *Moug. et Nestl. n.* 422. *Engl. Bot. t.* 2035. H. Stokesii. *Turn. Musc. Hib. p.* 159. *t.* 15. *f.* 2. *Engl. Bot. t.* 2036. H. Swartzii. *Turn. Musc. Hib. p.* 151. *t.* 14. *f.* 1 & 2. *Engl. Bot. t.* 2034. H. atro-virens. *Swartz.—Dill. Musc. t.* 35. *f.* 15.

Hab. Moist shady banks and on trunks of trees, especially on such as are in a state of decay.

Mohr has justly observed how extremely variable is this plant in its mode of growth, nor have we brought together

so many synonyms without a cautious examination of authentic specimens. In mountainous marshy situations the variety named *Stokesii*, with closely set, bipinnate branches, occurs; and in wet hollows in banks is found the var. *Swartzii*, which is well represented in the magnified figure of Turner's *Musc. Hib. t.* 14. *f.* 2. *b.* It is characterized by its slender straggling branches, narrow and black green leaves.

§ § *Stems pinnate, or irregularly branched.*

33. *H. flagellare*; stems pinnate (or irregularly bipinnate); leaves thickly set, cordato-acuminate, serrated, very faintly two-nerved at the base; capsule oblong, cernuous; lid conical. (Tab. XXV.)

H. flagellare. *Dicks. Pl. Crypt. fasc.* 2. *p.* 12. *Smith Fl. Brit. p.* 1322. (not of *Hedw.*) H. umbratum. *Engl. Bot. t.* 2565. *Turn. Musc. Hib. p.* 158. (not of *Hedw.*)

Hab. Rocks in alpine countries. Plentiful in Ireland.

By means of authentic specimens from Mr. Dickson, of his *H. flagellare*, we have ascertained that it is the *H. umbratum* of Turner and Smith and not of Hedwig, which differs in its ramification, its striated, much more strongly serrated leaves, and its longer divided nerve, approaching very nearly to *H. triquetrum*; especially that variety of it called *brevirostre* by Ehrhart. Hedwig's *H. flagellare* is *H. plumosum.*

34. *H. abietinum*; stems pinnate; leaves serrated, papillose on the back, the margins reflexed, nerve running nearly to the point; the cauline ones cordato-acuminate, those of the branches cordato-acute; capsules cylindrical, inclined; lid conical. (Tab. XXV.)

H. abietinum. *Linn. Sp. Pl. p.* 1591. *Hedw. St. Cr. v.* 4. *t.* 32. *Turn. Musc. Hib. p.* 162. *Engl. Bot. t.* 2037. *Moug. et Nestl. n.* 226. —*Dill. Musc. t.* 35. *f.* 17.

Hab. On the ground in mountainous and principally calcareous soils.

Swartz's specimens are very different from our own in having a remarkable furrow in the leaf, as seen from above, and consequently a projecting keel beneath; nor is there any nerve. We are sorry we have not had the opportunity of examining if the Linnæan species be the same. Ours is the same as we have received from various Continental botanists. The fruit is extremely rare, and never that we know of produced in this country.

35. *H. Blandovii*; stems pinnate; leaves serrated, smooth on

the back, margins reflexed; the cauline ones cordato-acute, with a short nerve; those of the branches ovato-acuminate, with the nerve disappearing beyond the middle; capsules cylindrical, inclined; lid conical. (Tab. XXV.)

H. Blandovii. *Web. et Mohr Fl. Cr. Germ. p.* 332. *Sturm Deutschl. Fl.* (with a figure.)

Hab. Rocks in subalpine countries.

For this interesting addition to the British mosses we are indebted to Mr. Joseph Woods, who found it on the rocks at Tunbridge. Mohr, who first distinguished it from the preceding species, says very justly, "facies *H. abietini*, a quo tamen differt ut *H. splendens* ab *H. tamariscino*."

36. *H. piliferum*; stems somewhat pinnate; leaves ovate, with a long narrow acumination, serrated, nerve disappearing below the middle; capsule ovate, cernuous; lid rostrate. (Tab. XXV.)

H. piliferum. *Schreb. Fl. Lips. p.* 91. *Hedw. St. Cr. v.* 4. *t.* 14. *Turn. Musc. Hib. p.* 178. *Engl. Bot. t.* 1516.

Hab. Banks. Fructification rare.

This is a distinctly marked plant in its exactly ovate stem-leaves, with a long point so suddenly acuminated that they appear, especially when dry, to be hair-pointed. Those of the stem terminate more gradually, and scarcely justify the specific name.

37. *H. rutabulum*; stems variously branched; leaves patent, ovate, acuminated, serrated at the points, striated, their nerve reaching half way; capsule ovate, cernuous; fruitstalk rough; lid conical. (Tab. XXVI.)

H. rutabulum. *Linn. Sp. Pl. p.* 1590. *Hedw. St. Cr. v.* 4. *t.* 12. *Turn. Musc. Hib. p.* 179. *Smith Fl. Brit.—Moug. et Nestl. n.* 143. H. brevirostre. *Engl. Bot. t.* 1647. (not of *Ehrh.*) H. crenulatum. *Engl. Bot. t.* 1261.—*Dill. Musc. t.* 38. *f.* 29.

Hab. On trees and on banks, extremely common.

*H. brevirostre*, a name previously given by Ehrhart to a variety of *Hypnum triquetrum*, can never be applied to the present species.

38. *H. velutinum*; stems variously branched; leaves erecto-patent, ovate, often approaching to lanceolate, acuminated, serrated, striated, nerve reaching half way; capsule ovate, cernuous; fruitstalk rough; lid conical. (Tab. XXVI.)

H. velutinum. *Linn. Sp. Pl. p.* 1595. *Hedw. St. Cr. v.* 4. *t.* 27. *Turn. Musc. Hib. p.* 167. *Engl. Bot. t.* 1568. H. intricatum. *Hedw. St. Cr. v.* 4. *t.* 28. *Turn. Musc. Hib. p.* 167. *Engl. Bot. t.* 2421. H. Teesdalii. *Dicks. ?—Dill. Musc. t.* 42. *f.* 61.

Hab. Woods and hedge-banks, common.

The character here given will show how closely this species is allied to the preceding; and indeed, except in the smaller size and the somewhat narrower leaves, and their more upright direction, we can find no mark of distinction. So also in the *H. intricatum* of authors, the specimens that we have seen are smaller than in our *H. velutinum*, and the leaves less broad. Hedwig mentions a difference in the annulus, which we have not been able to verify.

39. *H. ruscifolium*; stems variously branched, leaves loosely imbricated, subpatent, broadly ovate, acute, serrated, concave, their nerve reaching nearly to the summit; capsule ovate, cernuous; lid rostrate. (Tab. XXVI.)

H. ruscifolium. *Neck. Meth. Musc.—Turn. Musc. Hib. p.* 153. *Engl. Bot. t.* 1275. H. riparioides. *Hedw. St. Cr. v.* 4. *t.* 4. *Moug. et Nestl. n.* 427. H. prolixum. *Dicks.*—H. atlanticum. *Desfont. Fl. Atlant.*—*Dill. Musc. t.* 38. *f.* 31 & 32.

Hab. Upon wood and stones in pools and rivers.

The stems often exceed a span in length, and the leaves in certain situations attain a greater size than in any British species of *Hypnum*.

40. *H. striatum*; stems variously branched; leaves patent, cordato-acuminate, serrated, striated; nerve reaching beyond the middle; capsule oblongo-ovate, cernuous; fruitstalk smooth; lid rostrate. (Tab. XXVI.)

H. striatum. *Schreb. Fl. Lips. p.* 91. *Hedw. St. Cr. v.* 4. *t.* 13. *Turn. Musc. Hib. p.* 180. *Engl. Bot. t.* 1648. *Moug. et Nestl. n.* 142. H. longirostrum. *Ehrh.—Dill. Musc. t.* 38. *f.* 30.

This species comes near in habit to *H. rutabulum*; but is a larger and more robust plant, with leaves more patent; broader and more decidedly striated, with a shorter point and longer nerve: the fruitstalks are smooth, and the lid rostrate.

41. *H. confertum*; stems variously branched; leaves erecto-patent, ovate, acuminated, concave, serrated, their nerve reaching half way; capsule ovate, cernuous; fruitstalk smooth; lid rostrate. (Tab. XXVI.)

H. confertum. *Dicks. Pl. Crypt. fasc.* 4. *t.* 11. *f.* 4. *Engl. Bot. t.* 2407. H. serrulatum. *Hedw. Sp. Musc. t.* 60. *Engl. Bot. t.* 1262.

Hab. Trunks of trees, old rails, and on banks.

We have compared this with the Pennsylvanian *H. serrulatum* of Hedwig, and cannot find even the slight differences which Mohr has noticed. A small variety, growing on trees, has the leaves occasionally subsecund.

B. *Leaves squarrose.*

42. *H. cuspidatum*; leaves loosely set, ovate, concave, nerveless, entire, the lower ones squarrose, those at the summit closely imbricated into a cuspidate point; capsule oblong, curved, cernuous; lid conical. (Tab. XXVI.)

H. cuspidatum. *Linn. Sp. Pl. p.* 1595. *Turn. Musc. Hib. p.* 177. (excluding the var. β.) *Engl. Bot. t.* 2407. *Moug. et Nestl. n.* 227.—*Dill. Musc. t.* 39. *f.* 34.

Hab. Bogs.

The habit of this plant is very similar to that of *H. cordifolium*, a dark variety of which Mr. Turner has made his var. β. The present plant is easily known by the sharp cuspidate extremities.

43. *H. cordifolium*; leaves loosely set, squarrose, cordato-ovate, obtuse, concave, entire, their nerve running very nearly to the point; capsule oblong, curved, cernuous; lid conical. (Tab. XXVI.)

H. cordifolium. *Hedw. St. Cr. v.* 4. *t.* 37. *Engl. Bot. t.* 1447. H. cuspidatum. β. *Turn. Musc. Hib. p.* 177.

Hab. Bogs.

A purple variety of this plant, generally barren, is found in alpine situations, frequently assuming a fasciculated appearance, with the tops of the branches having the leaves convolute; and if the nerve of the leaf be not accurately observed it may be taken for *H. cuspidatum*. It is accordingly the var. β. of that plant in the *Musc. Hib.*

44. *H. polymorphum*; leaves loosely set, squarrose, cordate, much acuminated, entire, nerve disappearing half way up; capsule oblongo-ovate, curved, cernuous; lid conical. (Tab. XXVI.)

H. polymorphum. *Hedw. Sp. Musc. t.* 66. (nerve of the leaf omitted.) H. chrysophyllum. *Brid. Musc. v.* 2. *t.* 2. *f.* 2. *Mohr?*

Hab. Limestone rocks in Ireland. Chalky downs in Sussex. *Mr. Borrer.*

Without authentic specimens we cannot feel ourselves competent to decide whether Mohr's *H. chrysophyllum* be or be not our plant; though if we were to judge from his description we could have but little doubt of their identity. Specimens sent by Mohr, probably through a mistake, under the last-mentioned name, belong truly to *H. stellatum*. He has himself cautioned us that the two plants only differ by the presence or absence of the nerve. We have compared specimens of Hedwig's *H. polymorphum*, and find them to

accord precisely with our plant; and hence we are enabled to detect the error of the omission of the nerve in the figure above quoted.

45. *H. stellatum*; leaves loosely set, squarrose, cordate, much acuminated, entire, nerveless; capsule oblongo-ovate, curved, cernuous; lid conical. (Tab. XXVI.)

*α. majus.*

H. stellatum. *Schreb. Fl. Lips. p.* 92. *Hedw. Sp. Musc. p.* 280.—*Turn. Musc. Hib. p.* 183. *Engl. Bot. t.* 1302. *Moug. et Nestl. n.* 234. H. protensum. *Brid.—Dill. Musc. t.* 39. *f.* 35.

*β. minus.*

H. squarrosulum. *Brid.—Engl. Bot. t.* 1709.

Hab. *α.* in marshes. *β.* on stone walls and rocks.

The larger variety of this plant is of a fine yellow brown colour, and is not rare in fruit; the smaller variety, which is less upright, is of a greener tint, and has the leaves somewhat more recurved.

46. *H. loreum*; leaves recurved, squarrose, lanceolate, much acuminated, concave, serrated, striated, faintly two-nerved at the base; capsule globoso-ovate, cernuous; lid conical. (Tab. XXVI.)

H. loreum. *Linn. Sp. Pl. p.* 1593. *Turn. Musc. Hib. p.* 183. *Engl. Bot. t.* 2072. *Moug. et Nestl. n.* 232.—*Dill. Musc. t.* 39. *f.* 40.

Hab. Woods and on heaths, among bushes.

Stems from a span to nearly a foot in length. Leaves often subsecund.

47. *H. triquetrum*; leaves squarrose, cordato-acuminate, serrated, faintly striated, with two nerves at the base; capsule globoso-ovate; lid conical. (Tab. XXVI.)

*α. majus.*

H. triquetrum. *Linn. Sp. Pl. p.* 1589. *Turn. Musc. Hib. p.* 186. *Engl. Bot. t.* 1622. *Moug. et Nestl. n.* 235.—*Dill. Musc. t.* 38. *f.* 28.

*β. minus.*

H. brevirostrum. *Ehrh.* (not *Smith.*)

Hab. Woods abundant.

Plant robust, from six to eight or ten inches long; stems pinnate. The variety *β.* is not half the size, more slender in its habit, and has the leaves narrower and more acuminated. We have already noticed the similarity it bears with Ehrhart's *H. umbratum*; but in this var. of *H. triquetrum* the leaves are longer, more striated, less patent, and less serrated.

48. *H. squarrosum*; leaves squarrose, widely cordate, very much acuminated and recurved, serrated, faintly two-nerved at

the base; capsule ovato-globose, cernuous; lid conical. (Tab. XXVI.)

H. squarrosum. *Linn. Sp. Pl. p.* 1593. *Turn. Musc. Hib. p.* 184. *Engl. Bot. t.* 1953. *Moug. et Nestl. n.* 233.—*Dill. Musc. t.* 39. *f.* 38 & 39.

Hab. Woods and on heaths, common.

Stems slender, from four to six inches long, variously branched.

2. *Leaves secund.*

A. *Leaves with a single nerve.*

49. *H. filicinum*; stems subpinnate; leaves, especially the upper ones, falcato-secund, broadly ovate, acuminated, serrated, their nerve reaching to the point; capsule oblongo-ovate, curved, cernuous; lid conical. (Tab. XXVI.)

H. filicinum. *Linn. Sp. Pl. p.* 1590. *Hedw. Sp. Musc. t.* 76. *f.* 5-10. *Turn. Musc. Hib. p.* 197. *Engl. Bot. t.* 1570. *Moug. et Nestl. n.* 228. H. dubium. *Swartz.—Engl. Bot. t.* 2126. *Turn. Musc. Hib. p.* 195. H. fallax. *Brid. Musc. v.* 3. *t.* 2. *f.* 1. *Engl. Bot.—Dill. Musc. t.* 36. *f.* 19.

Hab. Bogs and sides of rivulets.

This plant is subject to vary greatly in its general appearance, in size, and somewhat in the shape and direction of its leaves. Its stems are erect, pinnate, frequently with downy ferruginous roots; and the stems themselves and nerves of the leaves are reddish brown. The cauline leaves are the shortest and broadest, with the nerve excurrent, which is characteristic of the species, and, together with the less falcate foliage, distinguishes it from *H. commutatum*, notwithstanding that Schwaegrichen has lately united them. The large variety, growing in running water, is the *H. fallax* of *English Botany*, and probably also of Bridel. But this again Schwaegrichen has joined to *H. fluviatile*, a plant we believe unknown to Britain, and appearing, as far as we can judge from the figure in the *Species Muscorum*, very unlike *H. fallax*. *H. falcatum* of Bridel likewise seems, from the author's description, scarcely different from our plant, which, when growing in waters impregnated with calcareous matter, is seen to have the stems bristly at the base, from the strong nerves that remain after the decay of the rest of the leaf.

50. *H. atro-virens*; stems variously branched, procumbent; leaves, all of them, slightly secund, broadly ovate, with an attenuated obtuse point, nerve running nearly to the summit; capsule ovate, cernuous; lid conical. (Tab. XXVI.)

H. atro-virens. *Dicks. Pl. Crypt. fasc.* 2. *p.* 10. *Turn. Musc. Hib. p.* 169. *Engl. Bot. t.* 2422. H. filamentosum. *Dicks. Pl. Crypt. fasc.* 2. *p.* 11. *Smith Fl. Brit. p.* 1308. H. attenuatum. *Dicks.—Engl. Bot. t.* 2420. (*not* Leskea attenuata. *Hedw.*) Leskea incurvata. *Hedw. Sp. Musc. t.* 53. (*not* H. incurvatum. *Mohr & Schwaegr.*) *Moug. et Nestl. n.* 421.

Hab. Trees and rocks in mountainous countries.

Sir James Smith, on the authority of Dillenius, has attributed to *H. atro-virens* a subulate lid: but the plant referred to in the *Hist. Musc. t.* 43. *f.* 67, is a very distinct species from Virginia (not Patagonia, as mentioned by mistake in *Engl. Botany*). *H. filamentosum* of Dickson differs in no particular from our plant, nor does the *H. attenuatum* of the same author, as we have ascertained by an examination of his own specimen in Mr. Turner's Herbarium. Equally authentic specimens, viz. from the younger Hedwig, prove our plant to be the same as his *Leskea incurvata*, but we have preferred the older name given by our countryman. We have been greatly inclined to add to our synonyms *H. fluviatile*, which accords so well in its foliage; but that has more distantly placed leaves, and a longer capsule. Our plant likewise bears no inconsiderable resemblance in many points to *H. filicinum*; it differs however in being procumbent, in its loose and straggling ramification, more closely set, shorter, broader, more concave and more obtuse leaves, with the margin more reflexed, quite entire, the nerve broader, of the same colour as the leaf, disappearing below the point: besides all which the texture of the leaves is thicker and softer, with distinct cellules; whereas in *H. filicinum* they are somewhat scariose.

51. *H. palustre*; leaves secund, ovate, somewhat acuminate, concave, entire, margins incurved above; nerve short, often forked, sometimes obsolete; capsule oblongo-ovate, cernuous; lid conical. (Tab. XXVI.)

H. palustre. *Linn. Sp. Pl. p.* 1593. *Turn. Musc. Hib. p.* 191. *Engl. Bot. t.* 1665. H. luridum. *Hedw. St. Cr. v.* 4. *t.* 38. H. fluviatile. *Turn. Musc. Hib. p.* 192. *Engl. Bot. t.* 1303. (not of *Hedw.*) H. adnatum. *Turn. Musc. Hib. p.* 165. *Engl. Bot. t.* 2406. (not of *Hedw.*) —*Dill. Musc. t.* 37. *f.* 27.

Hab. Banks of rivers and standing waters, and on wet rocks, abundant.

Variable as is this species, we trust it will be found constant to the above characters. The plant, or at least the main stems, is usually upright, thickly crowded; the leaves flaccid, varying from a deep lurid green, the most common

tint, to a bright and pale yellow in some situations. The nerve is sometimes obsolete, rarely half the length of the leaf, more frequently forked or double. Dr. Stokes' specimens of *H. fluviatile*, figured in *Engl. Bot.*, are *H. palustre*; and we do not know that the true *fluviatile* has ever been found in Britain. Such is the case also with the *H. adnatum* of *Engl. Bot.* The true *H. adnatum* has a differently shaped leaf, and is, we believe, altogether an American plant.

52. *H. aduncum*; leaves falcato-secund, lanceolato-subulate, concave, or almost semicylindrical, entire, the nerve disappearing below the summit; capsule oblongo-ovate, curved, cernuous; lid conical. (Tab. XXVI.)

*α. revolvens*; leaves narrow, very much falcate:

H. aduncum. *Linn. Sp. Pl. p.* 1592. *Hedw. St. Cr. v.* 4. *t.* 24. *Turn. Musc. Hib. p.* 189. *Smith Fl. Brit. p.* 1327. H. revolvens. *Swartz Musc. Suec.—Turn. Musc. Hib. p.* 188. *Engl. Bot. t.* 2073.—*Dill. Musc. t.* 37. *f.* 26.

*β. rugosum*; leaves wider, less falcate, somewhat rugose.

H. rugosum. *Linn. Mant. p.* 131. (according to *Smith.*) *Engl. Bot. t.* 2250. (not of *Hedw.* nor *Schwaegr.*) H. lycopodioides. *Schwaegr. Suppl. pars* 2. *p.* 300.—*Dill. Musc. t.* 37. *f.* 24.

Hab. Bogs, common.

We have but little hesitation in uniting the three species as they have hitherto been considered, *aduncum*, *revolvens*, and *rugosum*:—and Schwaegrichen, who has kept them separate in his late valuable Supplement to Hedwig's *Species Muscorum*, yet says of them, "inter se pari affinitate conjunguntur et ulteriorem disquisitionem in loco natali, in quo copiose inveniuntur, exiguunt." *H. revolvens* scarcely differs from the common appearance of *aduncum*, but in its deeper almost purple-black colour, and generally more falcate leaves; whilst these are in the var. *rugosum* much broader, somewhat wrinkled, especially when dry, and the nerve we have remarked to be usually longer. In size and general habit this variety comes near *H. scorpioides*, but that has no nerve.

53. *H. uncinatum*; leaves falcato-secund, lanceolato-subulate, serrated, striated, nerve disappearing below the point; capsule cylindrical, curved, cernuous; lid conical. (Tab. XXVI.)

H. uncinatum. *Hedw. St. Cr. v.* 4. *t.* 5. *Turn. Musc. Hib. p.* 190. *Engl. Bot. t.* 1600. *Moug. et Nestl. n.* 335.

Hab. Moist banks and walls, principally in subalpine countries.

The slender stems, which are pinnated, the long and

uncinate leaves and brighter colour, together with their striation and serratures, abundantly distinguish this from *H. aduncum* and all its affinities.

54. *H. rugulosum*; leaves secund, ovato-lanceolate, serrated, nearly plane, crisped transversely when dry, margins recurved, nerve reaching half way. (Tab. XXVI.)

H. rugulosum. *Web. et Mohr Fl. Crypt. Germ. p.* 366. *Moug. et Nestl. n.* 231. H. rugosum. *Hedw. Sp. Musc. p.* 293. *Hedw. St. Cr. v.* 4. *t.* 23. *f.* A. (leaf only.) *Schwaegr. Suppl. pars* 2. *p.* 301.

Hab. On the ground in heathy places in Norfolk. *Mr. Eagle.*

Plant from two to four inches in length, creeping in dense tufts upon the ground, of a yellow green colour, often bordering on brown. The transverse undulations are peculiarly striking, even to the naked eye, in which particular, as well as in the broader and shorter, more plane, secund but not falcate leaves, it differs from all the varieties of *H. aduncum*. Its fructification, we believe, has never been found in any country.

55. *H. commutatum*; stems pinnated; leaves falcato-secund, cordate, very much acuminated, serrated, their margins reflexed, nerve disappearing below the summit; capsule oblongo-ovate, curved, cernuous; lid conical. (Tab. XXVII.)

H. commutatum. *Hedw. St. Cr. v.* 4. *t.* 26. *Turn. Musc. Hib. p.* 196. *Engl. Bot. t.* 1569.—*Dill. Musc. t.* 36. *f.* 19.

Hab. Wet places, particularly in a calcareous soil.

Besides the characters we have pointed out under *H. filicinum* to distinguish that and the present species, we may add that this is much the largest, far less rigid in the stems and leaves, and of a paler and greener colour. The leaves are likewise (for want of the excurrent nerve) disposed to be curved, and to become twisted when dry.

B. *Leaves destitute of a nerve, or furnished with two very indistinct ones at the base.*

56. *H. scorpioides*; leaves secund, broadly ovate, ventricose, obtuse, entire, nerveless; capsules oblongo-ovate, curved, cernuous; lid conical. (Tab. XXVII.)

H. scorpioides. *Linn. Sp. Pl. p.* 1592. *Hedw. Sp. Musc. p.* 295. *Schwaegr. Suppl. t.* 95. *Turn. Musc. Hib. p.* 187. *Engl. Bot. t.* 1039.

Hab. Bogs.

This, which is one of the largest of the British mosses, is at once distinguished from its affinities by its obtuse and nerveless leaves. Schwaegrichen has represented his mag-

nified leaves as two-nerved at the base, which we never could find to be the case in our specimens. It appears to be a species but little understood upon the Continent.

57. *H. silesianum*; leaves loosely imbricated, secund, narrow-lanceolate, acuminated, serrated, nerveless, or very obscurely two-nerved; capsule subcylindrical, erecto-cernuous; lid conical, obtuse. (Tab. XXVII.)

H. silesianum. *Pal. de Beauv. Prodr. p.* 70. *Web. et Mohr Fl. Cr. Germ. p.* 343. *Engl. Bot. t.* 2016. *Schwaegr. Suppl. t.* 94. *Moug. et Nestl. n.* 425. Leskea Seligeri. *Brid.*

Hab. Summit of Ben Luyal, in Sutherland.

This plant is scarcely to be known from some of the small varieties of *H. cupressiforme* but by its less falcate, more serrated, narrower leaves, and shorter lid. Indeed the serratures reach down nearly the whole length of the margins; but then we have observed them to be more or less apparent in different specimens. Schwaegrichen says that the fruitstalks arise from near the base of the stem, a circumstance which, though general, is not constant. We know of no habitat but that above given; nevertheless it is in the alpine parts of Switzerland extremely common, retaining all the characters we have given to it.

58. *H. cupressiforme*; leaves closely imbricated, more or less falcato-secund, lanceolate, acuminated, entire except at the points, which are usually serrated, very faintly two-nerved at the base; capsule cylindrical, erecto-cernuous; lid conical, with a point. (Tab. XXVII.)

α. *vulgaris*; stems broad, semicylindrical; leaves falcato-secund.

H. cupressiforme. *Linn. Sp. Pl. p.* 1592. *Hedw. St. Cr. v.* 4. *t.* 23. *Turn. Musc. Hib. p.* 193. *Engl. Bot. t.* 1860. *Moug. et Nestl. n.* 229. H. nigro-viride. *Dicks.—Turn.—Smith.—Dill. Musc. t.* 37. *f.* 23. and *t.* 41. *f.* 53.

β. *compressum*; stems slender, compressed; leaves falcato-secund.

H. compressum. *Linn. Mant. v.* 2. *p.* 310.—*Dill. Musc. t.* 36. *f.* 22.

γ. *tenue*; stems very slender; leaves very slightly curved, narrow-lanceolate, quite entire.

H. polyanthos. *Engl. Bot. t.* 1664. (*not* Leskea polyanthos. *Hedw.*) *Turn. Musc. Hib. p.* 137.

Hab. On banks and trunks of trees, extremely common; β. particularly in shady woods; γ. mostly on trees.

So sportive is the present plant that it is scarcely possible to define in a few words the marks belonging to any of the varieties. The most striking one however is our γ, the *H. polyanthos* of British authors, but not the *Leskea polyanthos* of Hedwig, which is a true *Leskea*. At first sight

its appearance is totally unlike the more usual state of *H. cupressiforme*; and we should perhaps have hesitated about uniting them, had we not seen the one in some cases running completely into the other. The *Hypnum incurvatum* of Schrader and Schwaegrichen likewise borders very closely upon this state of *H. cupressiforme*, but it differs in the shorter and more cernuous capsule. The var. *compressum* is now universally acknowledged to belong to our plant; and we are equally satisfied of Mr. Dickson's *nigro-viride* being no other.

59. *H. Crista-castrensis*; stems closely pectinated; leaves falcato-secund, ovato-lanceolate, acuminated, serrulate, striated, faintly two-nerved at the base; capsule oblongo-ovate, curved, cernuous; lid conical. (Tab. XXVII.)

H. Crista-castrensis. *Linn. Sp. Pl. p.* 1591. *Hedw. Sp. Musc. t.* 7 *f.* 1-4. *Engl. Bot. t.* 2103. *Moug. et Nestl. n.* 140.

Hab. Scotland. *Mr. G. Don.*—In a wood at the hea of Hawes-water. *Rev. J. Dalton.*—Woods in Yorkshire *Mr. Backhouse.*

This most elegant species, so rare in this country, is on of the most abundant of mosses in the fir forests of Switzerland, bearing fruit in autumn. It is readily distinguishe from *H. molluscum*, not only by its much larger size, an more regularly pectinated stems, but by the strongly striated leaves.

60. *H. molluscum*; stems pectinated; leaves falcato-secun cordate, much acuminated, serrated, not striated, faintl two-nerved at the base; capsule oblongo-ovate, curve cernuous; lid conical. (Tab. XXVII.)

H. molluscum. *Hedw. St. Cr. v.* 4. *t.* 22. *Turn. Musc. Hib. p.* 19 *Engl. Bot. t.* 1327. *Moug. et Nestl. n.* 141. H. Crista-castrensi *Dicks.—Dill. Musc. t.* 36. *f.* 20.

Hab. On the ground, common.

This has been taken even by some of our British botanists for the preceding, but not by Dillenius, as Sir Jam Smith supposed. His figures, both A and B, belong tru to our present plant.

## 32. BRYUM.

GEN. CHAR. *Fruitstalks* terminal; *Peristome* double; the *exterior* of 16 teeth; the *interior* of a membrane cut into 16 equal segments, with filiform processes frequently placed between them; *Calyptra* dimidiate. (TAB. III.)

For the same reason as we have united *Leskea* with *Hypnum* have we incorporated *Pohlia* of Hedwig with *Bryum*. *Meesia*, likewise, we have called by the old name of *Bryum*; because, although the shortness of the teeth in two of the species be very striking, yet in *M. dealbata* they are nearly equal in length to the inner peristome. The genus *Mnium*, we think, cannot be separated from *Bryum* whilst *Hypnum undulatum* remains with that genus; whilst *Bartramia arcuata*, which has a smooth capsule, is retained with the other *Bartramiæ*, having sulcated capsules; and whilst similarly anomalous species are suffered to remain in many other genera.

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### I. *Capsules sulcated.*

1. *Br. androgynum*; stems nearly simple; leaves lanceolate, serrated, their margins recurved; capsules nearly erect, cylindrical, sulcated; lid conical. (TAB. XXVIII.)

   Bryum androgynum. *Hedw. Sp. Musc. p.* 178. *Turn. Musc. Hib. p.* 113. Mnium androgynum. *Linn. Sp. Pl. p.* 1574. *Engl. Bot. t.* 1238. Gymnocephalus androgynus. *Schwaegr. Suppl. pars* 2. *p.* 87.—*Dill. Musc. t.* 31. *f.* 1.

   HAB. In woods and on banks.

   Stems from one to two inches in length, slightly branched, erect. Leaves erect, appressed, or subpatent, lanceolate, acute, serrated, especially towards the extremity, the margins recurved; the nerve reaching nearly to the point; surface papillose; colour pale-yellow-green, especially when dry. Male flowers, as Hedwig considers them, capitular, terminating an elongated portion of the stem, upon which the leaves gradually become smaller and disappear upwards. Capsule cylindrical, scarcely inclined, sulcated, brown; lid conical.

2. *Br. palustre*; stems much branched; leaves lanceolate, obtuse, entire, their margins revolute; capsules ovate, oblique, sulcated; lid conical. (TAB. XXVIII.)

Bryum palustre. *Swartz.—Engl. Bot. t.* 391. *Turn. Musc. Hib. p.* 113. *Moug. et Nestl. n.* 135. Mnium palustre. *Linn. Sp. Pl. p.* 1574. *Hedw. Sp. Musc.—Schwaegr. Suppl.—Smith Fl. Brit.—Dill. Musc. t.* 31. *f.* 3.

HAB. Bogs.

Stems from two to four inches long, much branched, and frequently throwing out innovations. Leaves erecto-patent, lanceolate, obtuse, the margins much recurved or revolute, entire, or at most appearing but very indistinctly serrulate at the point, under a high magnifying power; the nerve reaching almost to the point; the surface papillose. Male flowers, according to Hedwig and other authors, discoid. Those terminal capitular bodies which so much resemble the anthers of *Br. androgynum* are considered gemmæ, and arise not only from the main stems but from the innovations, which become gradually lengthened out, and are destitute of leaves. Capsules ovate, oblique, sulcated, brown; lid conical.

Notwithstanding the close affinity between the present and the preceding species, they have by many authors been placed in different genera. In both the leaves are of the same form and texture, but the present species has them somewhat obtuse, and for the most part entire: when otherwise, for they are subject to vary, the similarity is very great. In the capsule there is a further difference, and, according to the disciples of Hedwig, a more important one in the capitula terminating the stems or branches; for while in one species (*Br. androgynum*) they are considered to perform the office of anthers, in the other they can be only looked upon as gemmæ, the male flowers being discoid.

We wonder at Mohr's describing the leaf of *Br. palustre* to be subulate. Some of them, indeed, have the margins so revolute as to appear at first sight almost linear.

II. *Capsules smooth (destitute of furrows).*

1. *Teeth of the external peristome shorter than the interior one.*

3. *Br. trichodes*; stems somewhat branched; leaves linear, obtuse, entire, reticulated; capsule obovate, recurved, subcernuous; fruitstalk very long. (TAB. XXVIII.)

Bryum trichodes. *Linn. Sp. Pl. p.* 1585. *Dicks.—Engl. Bot. t.* 1517. Meesia uliginosa. *Hedw. St. Cr. v.* 1. *t.* 1, 2.—*Dill. Musc. t.* 49. *f.* 58.

HAB. Highland mountains, in wet places.

Stems an inch or more in length. Leaves erecto-pa-

tent, canaliculate; nerve strong, disappearing below the point; colour a deep yellow-green, shining. This and the two following species constituted the Hedwigian genus *Meesia*, characterized by the short obtuse teeth of the peristomium.

4. *Br. triquetrum*; stems elongated, branched; leaves lanceolate, carinate, acute, serrated, reticulated; capsule pyriform, erecto-cernuous; fruitstalks very long. (Tab. XXVIII.)

Br. triquetrum. *Turn. Musc. Hib. p.* 115. *Engl. Bot. t.* 2394. Mnium triquetrum. *Linn. Sp. Pl. p.* 1578. Meesia longiseta. *Hedw. St. Cr. v.* 1. *t.* 21, 22. Diplocomium longisetum. *Web. et Mohr Fl. Cr. Germ. p.* 874. *Moug. et Nestl. n.* 327.

Hab. On the borders of some lake in the north of Ireland. *Dr. Scott.*

The only station for this fine plant in the British dominions is that very vague one given above. We have seen the solitary specimen that has been communicated by Dr. Scott to Mr. Turner. It is intermixed with *Bryum dealbatum*. The present plant is remarkable for the great length of its fruitstalks, and for its broad, carinated, and serrated leaves, which are often trifariously inserted. Mohr has separated this from the two other species of *Meesiæ* in consequence of the segments of the inner membrane being connected by a reticulated substance ("*opere reticuloso connexa*"). We have ourselves seen portions of a cellular or reticulated membrane attached to these teeth, which probably in an earlier stage connected them for their whole length. The exterior teeth are short and obtuse, as in the preceding species.

5. *Br. dealbatum*; stems short, leaves lanceolate, acute, plane, serrated at the points, reticulated; capsules pyriform, nearly erect. (Tab. XXVIII.)

Br. dealbatum. *Dicks. Pl. Crypt. fasc.* 2. *t.* 5. *f.* 3. *Engl. Bot. t.* 1571. *Turn. Musc. Hib. p.* 115. Meesia dealbata. *Swartz Musc. Suec. t.* 5. *f.* 10. *Hedw. Sp. Musc. t.* 41. *f.* 6-9.

Hab. Boggy mountains in Scotland and Ireland.

This is less rare than *Bryum trichodes*, to which it has much affinity; but the leaves, when they come to be examined, are of a different form and texture, and the fruitstalks are shorter in proportion to the length of the stems. Although this has all the habit of a *Meesia*, it departs from the characteristic mark of that genus, in having the external teeth nearly as long as the internal peristome, and they can scarcely be called obtuse.

2. *Teeth of the exterior peristome as long as the interior one.*

* *Leaves subulate.*

6. *Br. pyriforme*; stems slightly branched; leaves subulato-setaceous, flexuose, serrated, nerve very broad; capsule pyriform, pendulous. (Tab. XXVIII.)

Br. pyriforme. *Swartz. Musc. Suec.—Moug. et Nestl. n.* 31. Br. aureum. *Turn. Musc. Hib. p.* 118. *Engl. Bot. t.* 389. Webera pyriformis. *Hedw. St. Cr. v.* 1. *t.* 3. Mnium pyriforme. *Linn.—Dill. Musc. t.* 50. *f.* 60.

Hab. Rocks, especially of sand-stone. Likewise on the mould of greenhouse pots.

*Bryum pyriforme* is remarkable in the shape of its leaves, of which the upper ones are much the longest and most flexuose. They are formed, moreover, except at the very base, almost wholly of nerve; there being only a narrow membranous margin, which, towards the extremity, is deeply serrated. The capsule and fruitstalk are of a bright orange-colour when mature.

** *Leaves never subulate.*

† *Leaves without any thickened margin.*

← *Leaves very obtuse.*

7. *Br. julaceum*; stems branched; leaves closely imbricated, broadly ovate, concave, entire, obtuse, nerve running nearly to the point; capsule obovato-cylindraceous, pendulous. (Tab. XXVIII.)

Br. julaceum. *Schrad. Spicil. p.* 70. *Engl. Bot. t.* 2270. Br. filiforme. *Dicks.*—Br. argenteum β. *Linn. Sp. Pl.—Schwaegr. Suppl.*—Hypnum argenteum *var.* β. *Mohr.—Dill. Musc. t.* 50. *f.* 63.

Hab. Mountains in England, Scotland, and Ireland.

The characters above given we have found constant in this plant, and we therefore cannot agree with Mohr and Schwaegrichen, who, with Linnæus, considered it merely as a variety of *Br. argenteum*. It is not in the shape of the leaf and of the capsules only that they differ, but our individuals are taller and more slender, of a yellowish green colour, resembling that of *Hypnum stramineum*, and the leaves are of the same colour and texture throughout. This species is never found on walls and roofs of houses, as is commonly the case with *Br. argenteum*, but on the sides of streams in mountainous situations.

*+ + Leaves acuminate or acute.*

*§ Nerve of the leaf disappearing below the point.*

8. *Br. crudum*; stems simple; leaves rigid, lanceolate, the upper ones the narrowest and longest, all of them plane, serrulate, nerve disappearing below the summit; capsule oblongo-subpyriform, cernuous. (Tab. XXVIII.)

Br. crudum. *Huds. Angl. p.* 491. *Engl. Bot. t.* 1604. *Turn. Musc. Hib. p.* 130. Mnium crudum. *Linn.—Hedw. St. Cr. v.* 1. *t.* 37.—*Dill. Musc. t.* 51. *f.* 70.

Hab. Banks in mountainous countries, and in the crevices of rocks.

Wahlenberg observes justly, that though the portions of the stem above the earth appear perfectly simple, many of them really arise from a common root. These stems have a singular appearance; from the leaves, which become gradually longer towards the extremity, and are of a shining yellow green, not changing their direction when dry. Their texture resembles that of the leaves of *Br. nutans*.

9. *Br. carneum*; stems simple; leaves lanceolate, reticulated, slightly serrulate at the point, nerve disappearing below the summit; capsule obovate, pendulous. (Tab. XXIX.)

Br. carneum. *Linn. Sp. Pl. p.* 1587. *Turn. Musc. Hib. p.* 119. *Engl. Bot. t.* 360. Br. delicatulum. *Hedw. St. Cr. v.* 1. *t.* 30. Br. pulchellum. *Hedw. St. Cr. v.* 3. *t.* 38. B ?—*Dill. Musc. t.* 50. *f.* 69.

Hab. Banks.

Stems short, rarely exceeding two or three lines, often bearing innovations, and more frequently throwing up sterile shoots from among the roots. The leaves want the bright green colour of the congeners, and exhibit under the microscope large reticulations. It is strange that Schwaegrichen should refer for his *Bryum erythrocarpum* to Mohr, who says only upon that plant "sub nomine *Br. erythrocarpi*, Brid. Suppl. MSS. etiam plantulam accepimus in monte Hube, prope Eibeck, a Bridelio lectam, quam a nostro (*Br. carneo*) discernere nequimus." We on the other hand have specimens perfectly agreeing with Schwaegrichen's figure of *Br. erythrocarpum*, which we consider only as slender varieties of *Br. cæspiticium*; and that author himself says, "differt a *Br. cæspiticio* caule tenero, foliorum forma et nervo parum tantum emergente, colore thecæ rufo."

Near to *Br. carneum* most authors place the *Bryum annotinum* (*Mnium*, Linn.) of Hedwig; a plant, we regret

to say, we are not acquainted with; at least not with any satisfactorily according with Hedwig's figure and description. According to this latter, its chief distinction from *Br. carneum* is to have the capsule "*elongato pyriformis.*" Smith says "*obovate;*" but then his fructified specimens in *Engl. Bot.* surely do not belong to the plant at all, for the leaves are obovate, strongly serrated, and the nerve ends in a hair-like point, as in *Br. capillare.*

10. *Br. argenteum*; stems branched; leaves closely imbricated, broadly ovate, suddenly and sharply acuminated, subserrulate, very concave, nerve disappearing below the point; capsule ovato-pyriform, pendulous. (TAB. XXIX.)

Br. argenteum. *Linn. Sp. Pl. p.* 1586. *Turn. Musc. Hib. p.* 122. *Engl. Bot. t.* 1602. *Moug. et Nestl. n.* 133.—*Dill. Musc. t.* 50. *f.* 62.

HAB. On the ground and on walls and roofs of houses, very common.

This plant has a remarkably silvery appearance, from the upper half of the leaves being scariose and white, whilst the lower part is green. The acuminated points, especially when dry, are patent, and resemble hairs. The whole leaf is thin and reticulated, and very different from *Br. julaceum*, with which the foreign authors have confounded it.

11. *Br. Zierii*; stems branched; leaves closely imbricated, more or less broadly ovate, acuminulate, very concave, reticulated, entire, nerve running nearly to the point; capsule clavate, cernuous. (TAB. XXIX.)

Br. Zierii. *Dicks. Plant. Crypt. fasc.* 1. *t.* 4. *f.* 10. *Hedw. Sp. Musc. t.* 44 *f.* 1-4. *Turn. Musc. Hib. p.* 123. *Engl. Bot. t.* 1021.

HAB. Mountains of England, Scotland, and Ireland.

This species, so remarkable for the form of its capsule, resembles the preceding in colour and in its large reticulation.

§ § *Nerve of the leaf reaching to the point, or beyond it.*

12. *Br. roseum*; leaves obovato-spathulate, acute, serrated, undulate, nerve running to the point; capsule oblongo-ovate, pendulous. (TAB. XXIX.)

Br. roseum. *Schreb. Fl. Lips. p.* 84. *Turn. Musc. Hib. p.* 132. *Engl. Bot. t.* 2395. Mnium roseum. *Hedw.—Dill. Musc. t.* 52. *f.* 77.

HAB. Banks and on heaths, especially in submountainous countries. Rare in fructification.

The stems of this fine species are branched below the surface of the ground; the rest of them is at the base bare of leaves; above the leaves are spread out in a stellated man-

ner, or, as Mr. Turner well observes, so as to resemble an expanded rose. We are indebted for our fructified specimens to Mr. Drummond, who found them near Cork. We know not if they have been found in that state any where else in Britain.

13. *Br. capillare*; stems short; leaves obovate, twisted when dry, entire, their nerve produced into a hair-like point, their margins slightly thickened; capsule oblong, pendulous. (Tab. XXIX.)

Br. capillare. *Linn. Sp. Pl. p.* 1586. *Turn. Musc. Hib. p.* 120. *Engl. Bot. t.* 2007. *Schwaegr. Suppl. t.* 74. *Moug. et Nestl. n.* 33. Br. stellare. *Engl. Bot. t.* 2434?—*Dill. Musc. t.* 50. *f.* 67.

This has been often, we believe, taken for *Bryum cæspiticium*; but the greater length of the capsule, the obovate leaves, twisted when dry, together with the hair-like point formed by the excurrent nerve, will always distinguish it.

We think the *Bryum stellare* of *Engl. Bot.* belongs to this species. It does not accord with the true *stellare*, which has not, that we are acquainted with, been yet found in Britain.

14. *Br. cæspiticium*; stems short; leaves ovate, acuminated, entire or very obscurely serrated at the points, the margins slightly recurved, the nerve reaching to or beyond the point; capsule between ovate and pyriform, pendulous. (Tab. XXIX.)

*α. major.*

Br. cæspiticium. *Linn. Sp. Pl. p.* 1586. *Turn. Musc. Hib. p.* 120. *Engl. Bot. t.* 1904. Br. Wahlenbergii. *Schwaegr. Suppl. t.* 70? Mnium lacustre. *Schwaegr. Suppl. t.* 77. Bryum erythrocarpum. *Schwaegr. Suppl. t.* 70?—*Dill. Musc. t.* 50. *f.* 66.

*β. minor.*

Br. bicolor. *Dicks. Plant. Cr. fasc.* 4. *p.* 16. *Turn. Musc. Hib. p.* 11. *f.* 2. *Engl. Bot. t.* 1601.

Hab. Banks, walls and roofs of houses, very common.

"Admodum polymorpha species pro solo natali. Viginti ad minimum habitu summopere diversas formas, a variis pro novis speciebus transmissas, habemus, quæ in genere foliis magis minusve erectis, latioribus, angustioribus, ut mox ovatæ, mox lanceolatæ formæ magis accedant, acumine et apiculo diversissimæ longitudinis, seta longiore brevioreve, etiam sporangio et operculo parum ab invicem recedunt; sed firmos limites nullos hasce discernendi invenimus; nec dubiis speciebus perplexissimum genus augere cupivimus." In all these remarks of the excellent Mohr we are disposed

fully to accord; and we ought perhaps to unite the following species with this, since we know of scarcely any character of importance but the different shape of the capsule. With regard to *Br. Wahlenbergii* we have been induced to refer it to this species from the shortness of its capsule, and the exact conformity of its leaves (according to Schwaegrichen's figures) to many of those in *Br. cæspiticium*, notwithstanding that the descriptions of Mohr and of Schwaegrichen himself are somewhat at variance with the above-mentioned figures. *Mnium lacustre* also of Schwaegrichen has in all its essential points the most perfect agreement with our plant; and although Mohr at first takes it up as a species, he afterwards is disposed to alter his opinion in a note at p. 483 of his *Fl. Cr. Germ.* *Bryum erythrocarpum* differs somewhat in the form of its capsule, which is by no means pyriform, but its leaves exactly accord with those of *Br. cæspiticium*.

15. *Br. turbinatum*; stems short, branched with innovations; leaves ovate, acuminated, nearly entire, the margins slightly recurved, the nerve running beyond the points; capsule elongato-pyriform, pendulous. (Tab. XXIX.)

Bryum turbinatum. *Swartz Musc. Suec. p.* 49. *Turn. Musc. Hib. p.* 126. *Engl. Bot. t.* 1572? *Moug. et Nestl. n.* 222. Mnium turbinatum. *Hedw. St. Cr. v.* 3. *t.* 8. Pohlia inclinata. *Schwaegr. Suppl. t.* 63. Bryum boreale. *Schwaegr. Suppl. t.* 69. Bryum pallens. *Schwaegr. Suppl. t.* 72. Bryum Schleicheri. *Schwaegr. Suppl. t.* 73? Bryum longisetum. *Schwaegr. Suppl. t.* 74. Webera intermedia. *Schwaegr. Suppl. t.* 75. Bryum pallescens. *Schwaegr. Suppl. t.* 75. Bryum nigricans. *Engl. Bot. t.* 1528?—*Dill. Musc. t.* 51. *f.* 74.

Hab. In wet, sandy and stony places, chiefly in mountainous countries.

We have no doubt of this being the "*Bryum palustre complicatum rubens, capsulis turbinatis pendulis*" of Dillenius, and this is the authority for Hedwig's *Mnium turbinatum*. How far it merits to be distinguished as a species from *Bryum cæspiticium* on the one hand, or *Br. ventricosum* on the other, must still remain a question. Mohr inclined to think them the same, and also that *Pohlia inclinata* is no other than *Webera intermedia*, of which he says, "nec forte ab insequente specie (*Br. cæspiticio*) separata esset, si rite peristomium esset investigandum." In another place he doubts if *Bryum boreale* and *Br. pallens* are different from *Br. cæspiticium*; and Schwaegrichen informs us that his *Br. pallescens* was considered by Mohr

as the same with *Br. boreale*. Of these plants indeed we are so unfortunate as to possess no authentic specimens; but we think that Mohr's opinion upon them is fully confirmed by the figures above quoted, and lately published by Schwaegrichen; for they differ in no essential point from our *Br. turbinatum*, which, as we have already observed, is by Mohr united with *Br. cæspiticium*. We have further added to our list of synonyms the *Bryum Schleicheri* and *Br. longisetum*; the former indeed approaching nearer to *Br. ventricosum* in its leaves, but agreeing with our plant in its capsules; thus being as it were exactly intermediate; and the latter differing from *Br. turbinatum* in nothing but the length of the fruitstalk.

All the states of *Br. turbinatum* are more or less furnished with innovations, as may be expected from plants growing in wet places, and the stems vary much in their length The capsule too varies somewhat in figure, but is always pyriform; and the whole plant is subject to great difference in colour, according to its exposure, and to the soil in which it grows.

16. *Br. nutans*; stems short; leaves erect, lanceolate, acuminated, serrated above, nerve reaching to the point; capsule oblongo-pyriform, pendulous. ((TAB. XXIX.)

Br. nutans. *Schreb. Fl. Lips. p.* 81. *Turn. Musc. Hib. p.* 117. *Engl. Bot. t.* 1240. *Moug. et Nestl. n.* 220. *and n.* 134 (*under the name of* Br. cæspiticium.) Webera nutans. *Hedw. St. Cr. v.* 1. *t.* 4. Br. compactum. *Engl. Bot. t.* 1527?—*Dill. Musc. t.* 50. *f.* 61.

HAB. Walls and heaths, principally in mountainous regions.

This species is remarkable, when the capsules are mature, for the bright colour of its fruitstalks, and for the narrow and glossy leaves, which in the barren shoots are almost linear, and are always at the extremity of the stems the least broad. The capsules are subject to vary somewhat in form; but it is to be observed that they are more pyriform as they advance in age, and when in a dried state.

17. *Br. elongatum*; stems short; leaves erect, elongato-lanceolate, acuminated, serrated, nerve reaching to the point; capsule elongato-clavate, inclined. (TAB. XXX.)

Bryum elongatum. *Dicks. Plant. Cr. fasc.* 2. *p.* 8. *Turn. Musc. Hib. p.* 114. *Engl. Bot. t.* 1603. Pohlia elongata. *Hedw. St. Cr. v.* 1. *t.* 36. Pohlia minor. *Schwaegr. Suppl. t.* 64. Bryum longicollum. (Webera, *Hedw.*) *Swartz Musc. Suec. t.* 6. *f.* 13. Bryum cylindricum. *Dicks. Plant. Crypt. fasc.* 4. *t.* 11. *f.* 4.

Hab. Mountains, especially in clefts of the rocks and in caves.

We can perceive no difference between Mr. Dickson's *Bryum cylindricum* and his *elongatum*; and the *Bryum longicollum* of Swartz, judging from the specimens we have received of it, is only a large variety; as *Pohlia minor* is a smaller state of the plant. Of this latter we have authentic specimens, in which the leaves are often as narrow as in the common appearance.

*Br. elongatum* is nearly allied to *Br. crudum*; but that species has much longer and more leafy stems, with an evanescent nerve and a shorter capsule. In both the leaves possess the same rigid and glossy texture; and in this respect are allied to *Br. nutans*. The peristome is that of a *Pohlia*.

18. *Br. alpinum*; stems rigid, elongated, branched; leaves closely imbricated, erect, lanceolate, somewhat obtuse, subserrulate at the apex, margins revolute, nerve reaching to the points; capsules oblongo-ovate, pendulous. (Tab. XXVIII.)

Br. alpinum. *Linn. Mant. v.* 2. *p.* 309. *Turn. Musc. Hib. p.* 125. *Engl. Bot. t.* 1623. *Moug. et Nestl. n.* 221. *Schwaegr. Suppl. t.* 73.—*Dill. Musc. t.* 50. *f.* 64.

Hab. On rocks in subalpine countries, common.

This species is best known by its deep shining purple colour, its rigid stems and leaves, which latter are straight as well when dry as when moist. It is nevertheless difficult to form a specific character that will separate it from some of the varieties of *Bryum ventricosum*. We do not observe the leaves to be "*octofariam imbricata*," as Schwaegrichen describes them.

19. *Br. ventricosum*; stems elongated, branched with innovations; leaves oblong, acuminated, scarcely serrulate, margins recurved, nerve reaching beyond the point; capsule oblongo-obovate, pendulous. (Tab. XXX.)

Br. ventricosum. *Dicks. Pl. Crypt. fasc.* 1. *p.* 4. *Turn. Musc. Hib. p.* 126. *Engl. Bot. t.* 2270. Bryum binum. *Schreb. Fl. Lips. p.* 83. *Turn. Musc. Hib. p.* 127. *Engl. Bot. t.* 1518. *Moug. et Nestl. n.* 223. Br. cubitale. *Dicks. Pl. Crypt. fasc.* 2. *t.* 5. *Engl. Bot. t.* 2554. Mnium pseudo-triquetrum. *Hedw. St. Cr. v.* 3. *t.* 7.—*Dill. Musc. t.* 51. *f.* 72, 73.

Hab. Marshy ground and in wet places in the crevices of rocks.

We have carefully examined authentic specimens of all

the synonyms above quoted, and have no hesitation in reducing them to one species. The stems are from two to four inches or more in length, including the innovations, which are very abundant, often of a deep brown or reddish colour, in which the foliage partakes more or less. The leaves are more or less crowded, generally erecto-patent, the nerve reddish, the margins revolute, the base decurrent, almost as much so as in *Mnium Duvalii* of Schwaegrichen (*Suppl. t.* 79.), which perhaps may be only a variety of our plant.

It must be allowed that the differences between this plant and *Bryum cæspiticium* are almost insufficient, and that it is more distinguishable by its larger size, proliferous habit, and brown or purple hue, than from any more essential characters; all of which may be fairly attributable to the place of growth, while the other affects dry banks and walls: and we should willingly have reduced these species to varieties if the example of all preceding muscologists had not forbidden it; not one of them having expressed the least doubt as to the identity.

We wish also that we could discover characters that would better indicate a specific difference between this plant and the preceding, *Br. alpinum*; which, always growing upon exposed rocks, has a dense habit, and is never proliferous. The place of growth may account also for its more erect rigid leaves; but these are certainly narrower than in our present plant, and the capsule is usually shorter.

†† *Leaves with their margins evidently thickened.*

§ *Leaves without denticulations.*

20. *Br. punctatum*; stems elongated; leaves obovato-rotundate, very obtuse, reticulated, their margins thickened, entire, nerve disappearing below the point; capsule ovate, pendulous; lid shortly rostrate. (Tab. XXX.)

Br. punctatum. *Schreb. Fl. Lips. p.* 85. *Turn. Musc. Hib. p.* 132. *Engl. Bot. t.* 1183. *Moug. et Nestl. n.* 136. Mnium punctatum. *Hedw.* —Mnium serpyllifolium *α. Linn. Sp. Pl. p.* 1577.—*Dill. Muse. t.* 53. *f.* 81.

Hab. Marshy places, particularly among the roots of alders, or other marsh trees.

The leaves of this moss are among the largest in the order *Musci*, and approach very nearly to those of *Cinclidium stygium*. The present and all the following species of *Bryum* agree in having the inner peristome of a firm and rigid texture, while the outer teeth are pale-coloured.

§ § *Leaves denticulated.*

21. *Br. ligulatum*; stems elongated; leaves undulate, ligulate, reticulated, their margins thickened, denticulate, nerve reaching a little beyond the point; capsule ovate, pendulous; lid conical. (Tab. XXX.)

Br. ligulatum. *Schreb. Fl. Lips. p.* 84. *Engl. Bot. t.* 1449. *Hook. in Fl. Lond. ed.* 2. (with a figure.) *Moug. et Nestl. n.* 420. Br. undulatum. *Turn. Musc. Hib. p.* 133. Mnium undulatum. *Hedw.*—Mnium serpyllifolium β. *Linn. Sp. Pl. p.* 1578.—*Dill. Musc. t.* 52. *f.* 76.

Hab. Moist banks and in woods, common.

Stems creeping and branched beneath the surface of the ground; branches erect, three or four inches in length, leafy; the leaves very large towards the extremities of the plant. The sterile plants are procumbent. It often happens that many fruitstalks arise from the same point.

22. *Br. rostratum*; stems elongated; leaves broadly ovate, reticulated, their margins thickened, obtuse, denticulated, the nerve reaching a little beyond the point; capsule ovate, pendulous; lid rostrate. (Tab. XXX.)

Br. rostratum. *Schrad. Spicil. p.* 72. *Engl. Bot. t.* 1475. *Moug. et Nestl. n.* 419. Mnium rostratum. *Schwaegr. Suppl. t.* 79.—*Dill. Musc. t.* 53. *f.* 80.

Hab. Subalpine countries. Yorkshire. *Rev. J. Dalton.*

This species approaches most nearly to *Br. punctatum*; but the whole plant is smaller, rarely exceeding an inch in height; the leaves are narrower and denticulate, of a softer texture, and the nerve runs beyond the extremity of the leaf, so as to form a short cuspidate point; the lid too has a longer beak. Calyptra very pale coloured. Fruitstalks from one to five.

23. *Br. marginatum*; stems elongated; leaves ovate, acute, reticulated, their margins thickened, serrated, nerve reaching a little beyond the point; capsule ovate, pendulous; lid shortly rostrate. (Tab. XXXI.)

Br. marginatum. *Dicks. Pl. Crypt. fasc.* 2. *t.* 5. *f.* 1. *Turn. Musc. Hib. p.* 129. *Engl. Bot. t.* 1493. Br. serratum. *Schrad.*—Mnium serratum. *Schwaegr. Suppl. t.* 78.

Hab. Woods and shaded banks in the north of England and in Ireland.

Whole plant when growing of a very yellowish hue. Stems simple, about an inch high. Leaves of a lurid green, especially when dry; when seen under a microscope the margin and nerve are of a deep blood colour, and the veil is of a red or orange colour, which renders the moss very discernible at first sight.

We are indebted for many important remarks relative to the *serpyllifolia-tribe* of the *Brya* to our kind friend the Rev. Mr. Dalton, as well as for excellent specimens of all the species.

24. *Br. hornum*; stems elongated; leaves lanceolate, acute, reticulated, their margins thickened, denticulate, nerve gerally disappearing below the summit; capsule oblongo-ovate, pendulous; lid hemispherical, mucronulate. (Tab. XXXI.)

Bryum hornum. *Schreb. Fl. Lips. p.* 83. *Turn. Musc. Hib. p.* 128. *Engl. Bot. t.* 2271. *Moug. et Nestl. n.* 34. Mnium hornum. *Linn. Sp. Pl. p.* 1576. *Hedw.—Dill. Musc. t.* 51. *f.* 71.

Hab. Marshy places and in wet woods.

Stems simple, erect, densely tufted, from two to three inches in length. Leaves with their margins and nerve reddish, the upper ones in the fertile plant very narrow, almost linear. Lid hemispherical, with a short point, in which it differs from the following species. Whole plant of a yellow lurid green colour.

25. *Br. cuspidatum*; stems elongated; leaves obovate, acute, reticulated, their margins thickened, denticulated above, nerve running beyond the point; capsule ovate, pendulous; lid conico-hemispheric, obtuse. (Tab. XXXI.)

Br. cuspidatum. *Schreb. Fl. Lips. p.* 84. *Turn. Musc. Hib. p.* 131. *Engl. Bot. t.* 1474. Mnium cuspidatum. *Hedw. Sp. Musc. t.* 45. *f.* 5-8. Mnium serpyllifolium β. *Linn. Sp. Pl. p.* 1577.—*Dill. Musc. t.* 53. *f.* 79. A—L.

Hab. In woods and on walls in shady situations.

Besides the difference alluded to, under the last described species, between this and *Br. hornum*, we may remark that the plant is smaller, lax in its mode of growth, with creeping sterile shoots (which, as Mr. Dalton observes, take root at the extremity); with broader, almost always obovate, and fewer leaves, the perichætial ones alone ovate or narrow-ovate; their texture is softer, so that they become crisped when dry: whereas those of *Br. hornum* are nearly as erect in that state as when growing. The foliage is altogether of a pale but bright green.

Mr. Dalton, whose late residence at Copgrove afforded him excellent opportunities of examining the mosses of this family, informs us that he never met with a specimen of the present species with more than one fruitstalk, and he is of opinion that Dillenius, *t.* 53. *f.* 79. M. is a different species. Schwaegrichen confirms this supposition, and has

quoted it under his *Mnium affine*, of which he says, "*Mnio cuspidato* valde similis, sed caulis 2-4-uncialis, valde tomentosus; folia latiora et minus acuminata, sæpe obtusa cum mucrone, serrato-ciliata, ciliis patentibus; setæ 2-3-uncialis, plerumque quinque; quatuor, tres, raro una:" and to this refers the *Mnium cuspidatum* of the *Species Muscorum*, excluding the Dillenian synonyms A—L. Whether a good species or not, we know of no instance of its being found in Britain. Dillenius received his specimen from Vaillant.

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*The Names printed in Italics are Synonyms, those in Capitals are the Genera.*


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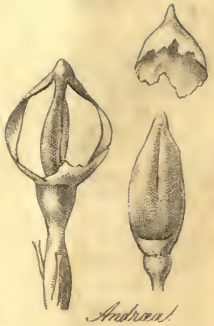
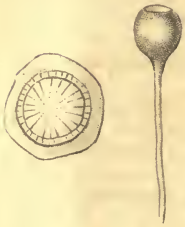
GENERA.



Andreæa.

Sphagnum.

Phascum.

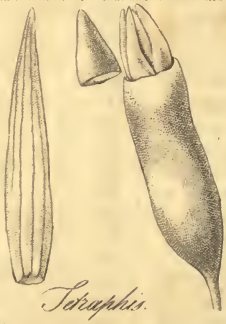


Schistostega.

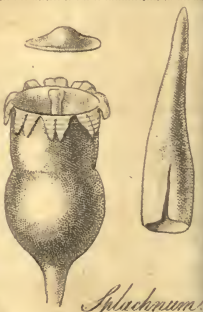
Archidium.

Gymnostomum.

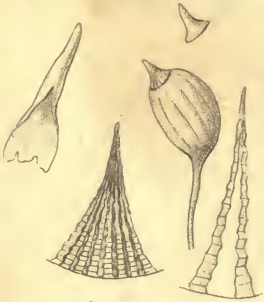
Diphyscium.



Schraphis.

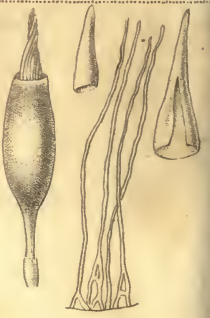


Splachnum.



Conostomum.

Polytrichum.



Cinclidotus.

# EXPLANATION OF THE PLATES.

## Tab. I. Genera.

(Andræa to Cinclidotus.)

Andræa. Capsules unopened and expanded, and Calyptra of *A. alpina* *.

Sphagnum. Capsules with the elongated Receptacle and portion of the Calyptra and Operculum of *S latifolium.*

Phascum. Capsule and Calyptra of *Ph. cuspidatum.*

Schistostega. Capsule and mouth of *S. pennata*, showing the laciniated Operculum.

Anictangium. Capsule, Operculum, and Calyptra of *An. ciliatum.*

Gymnostomum. Capsule, Operculum, and Calyptra of *G. truncatulum.*

Diphyscium. Capsule, Operculum, and Calyptra of *D. foliosum.*

Tetraphis. Capsule, Operculum, and Calyptra of *T. pellucida.*

Splachnum. Capsule, Operculum, and Calyptra of *S. sphæricum.*

Conostomum. Capsule, Operculum, Calyptra, and Peristome of *C. boreale.*

Polytrichum. f. 1. Capsule and Calyptra of *P. commune.* f. 2. Capsule and Calyptra of *P. undulatum.* f. 3. Mouth of the Capsule of *P. undulatum.*

Cinclidotus. Capsule, Operculum, Calyptra, and teeth of the Peristome of *C. fontinaloides.*

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* All the figures in the tables of Genera are more or less magnified.

## Tab. II. Genera.

(Tortula to Orthotrichum.)

Tortula. f. 1. Capsule and Calyptra of *T. subulata.* f. 2. Capsule of *T. cuneifolia.* f. 3. Capsule of *T. fallax.* f. 4. Capsule and Operculum of *T. rigida.*

Encalypta. f. 1. Capsule and teeth of the Peristome of *E. ciliata.* f. 2. Calyptra of *E. ciliata.* f. 3. Capsule, Operculum, and teeth of the Peristome of *E. streptocarpa.*

Grimmia. f. 1. Capsule, teeth of the Peristome, Operculum, and Calyptra of *Gr. apocarpa.* f. 2. Teeth of the Peristome of *Gr. Donniana.* f. 3. Teeth of the Peristome of *Gr. ovata.*

Pterogonium. f. 1. Capsule, Calyptra, and teeth of the Peristome of *Pt. Smithii.* f. 2. Teeth of the Peristome of *Pt. gracile.*

Weissia. f. 1. Capsule, Calyptra, and teeth of the Peristome of *W. striata.* f. 2. Capsule and portion of the Mouth of *W. striata,* with the teeth of the Peristome of *W. trichodes.*

Dicranum. f. 1. Capsule and Calyptra of *D. cerviculatum.* f. 2. Teeth of the Peristome of *D. cerviculatum.* f. 3. Teeth of the Peristome of *D. scoparium.* f. 4. Teeth of the Peristome of *D. spurium.*

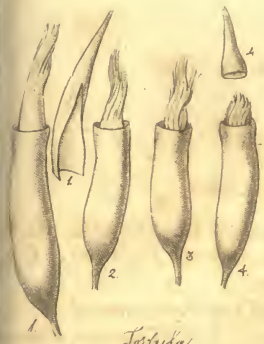
Trichostomum. f. 1. Capsule, Operculum, Calyptra, and teeth of the Peristome of *Tr. heterostichum.* f. 2. Teeth of the Peristome of *Tr. canescens.*

Leucodon. Capsule, Operculum, Calyptra, and teeth of the Peristome of *L. sciuroides.*

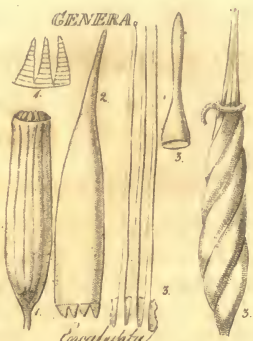
Didymodon. f. 1. Capsule, Operculum, Calyptra, and teeth of the Peristome of *D. trifarium.* f. 2. Teeth of the Peristome of *D. inclinatum.*

Funaria. Capsule, Operculum, Calyptra, and teeth of the Peristome of *F. hygrometrica.*

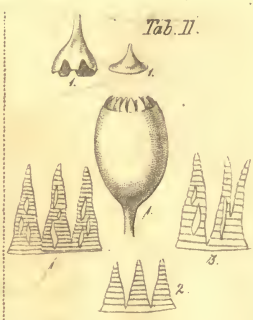
Orthotrichum. f. 1. Mouth of the Capsule and teeth of the Peristome of *O. striatum.* f. 2. Mouth of the Capsule and teeth of the Peristome of *O. affine.* f. 3. Capsule, mouth of the Capsule, Calyptra, and Operculum of *O. anomalum.*



Fontinalis.

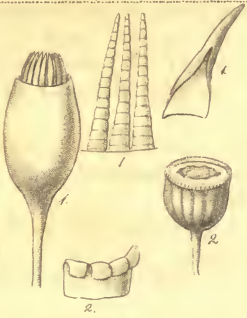


Encalypta.

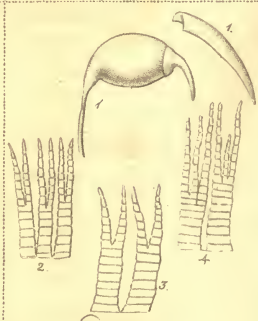


Grimmia.

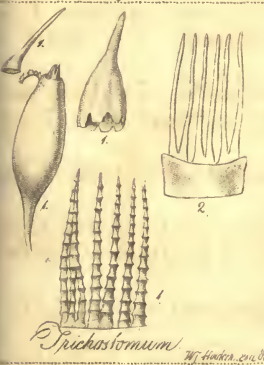
Pterygophyllum.



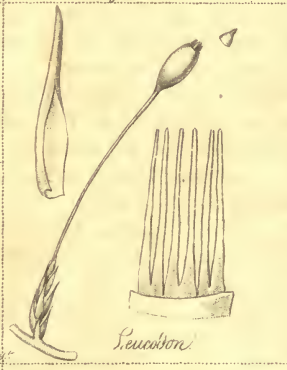
Weissia.



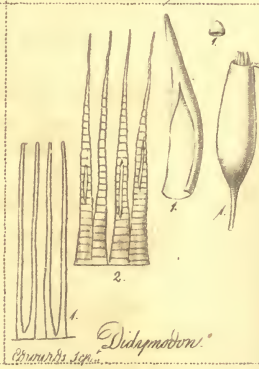
Dicranum.



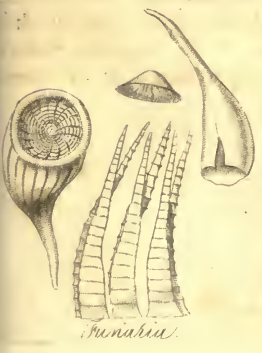
Trichostomum.



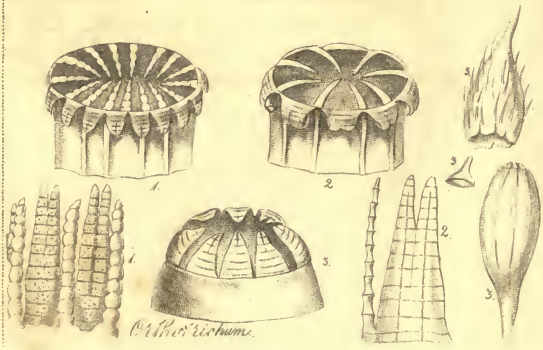
Leucobryum.



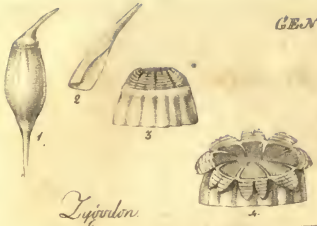
Didymodon.



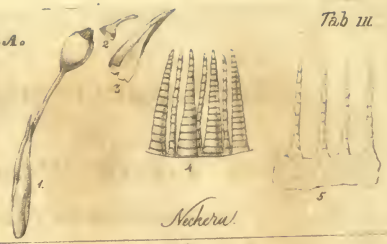
Funaria.



Orthotrichum.

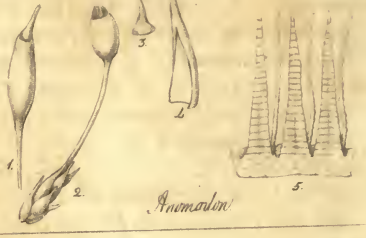


Zygodon.

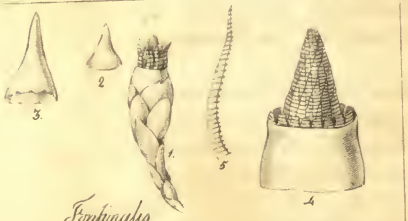


Neckera.

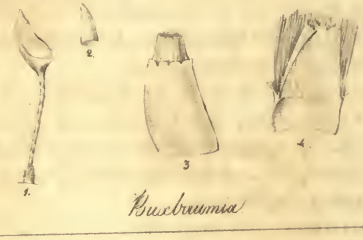
Dicranum.



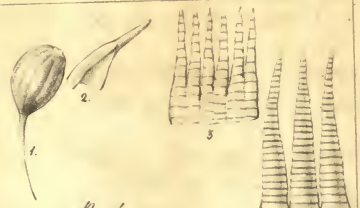
Anomodon.



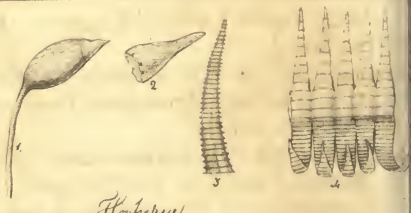
Fontinalis.



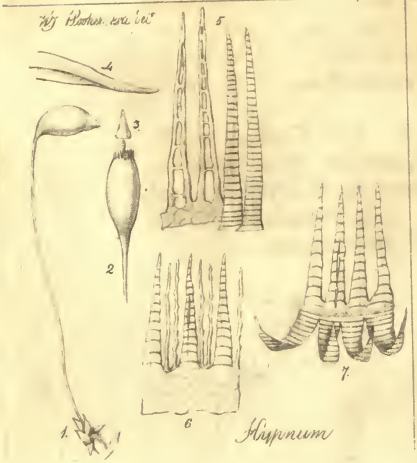
Buxbaumia.



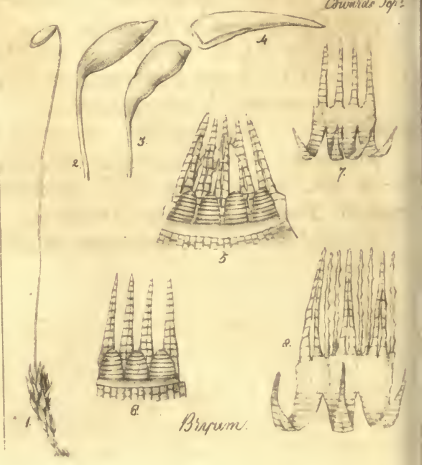
Barbula.



Hookeria.



Hypnum.



Bryum.

## Tab. III. Genera.

(Zygodon to Bryum.)

Zygodon. f. 1, 2, 3, 4. Capsule, Calyptra, mouth of a Capsule with the teeth closed, and mouth of a Capsule with the teeth expanded, of *Z. conoideum*.

Neckera. f. 1, 2, 3, 4. Capsule, Operculum, Calyptra, and teeth of the Peristome of *N. crispa*. f. 5. Portion of the inner Peristome of *N. crispa*.

Daltonia. f. 1, 2, 3, 4. Capsule, Operculum, Calyptra, and teeth of the Peristome of *D. heteromalla*. f. 5, 6. Capsule and Calyptra of *D. splachnoides*.

Anomodon. f. 1. Capsule of *An. viticulosum*. f. 2, 3, 4, 5. Capsule, Operculum, Calyptra, and teeth of the Peristome of *An. curtipendulum*.

Fontinalis. f. 1, 2, 3. Capsule, covered by its Perichætium, Operculum, and Calyptra of *F. antipyretica*. f. 4. Mouth of the Capsule of *F. antipyretica* deprived of its external teeth, to exhibit the inner Peristome. f. 5. Tooth of the outer Peristome.

Buxbaumia. *B. aphylla*. f. 1, 2. Entire plant and Calyptra. f. 3. Upper half of a Capsule. f. 4. Portion of the Peristome.

Bartramia. f. 1, 2. Capsule and Calyptra of *B. pomiformis*. f. 3. Portion of the inner Peristome. f. 4. Portion of the outer Peristome.

Hookeria. f. 1, 2. Capsule and Calyptra of *H. lucens*. f. 3. External tooth of the Peristome. f. 4. Portion of the Peristome, with the outer teeth laid open.

Hypnum. f. 1. Capsule of *H. rutabulum*. f. 2, 3. Capsule and Operculum of *H. dendroides*. f. 4. Calyptra of *H. rutabulum*. f. 5. Portion of the Peristome of *H. dendroides*. f. 6. Inner Peristome of *H. rutabulum*. f. 7. Inner Peristome of *H. complanatum*.

Bryum. f. 1. Plant of *Br. cæspiticium*. f. 2. Capsule of *Br. palustre*. f. 3. Capsule of *Br. triquetrum*. f. 4. Calyptra of *Br. triquetrum*. f. 5. Peristome of *Br. triquetrum*. f. 6. Peristome of *Br. trichodes*. f. 7. Peristome of *Br. elongatum*. f. 8. Peristome of *Br. ventricosum*.

## Tab. IV. Species.

(Sphagnum.)

*S. latifolium.* Large and small variety, *nat. size.* Leaves and portion of a leaf exhibiting the structure, *magn.*
*S. squarrosum.* Plant, *nat. size.* Leaf, *magn.*
*S. acutifolium.* Plant, *nat. size.* Leaf, *magn.*
*S. cuspidatum.* Plant, *nat. size.* Leaf, *magn.*

## Tab. V. Species.

(Phascum.)

*P. serratum.* Plant, *nat. size.* Plant and leaf, *magn.*
*P. alternifolium.* Plant, *nat. size.* Plant and leaves, *magn.*
*P. crispum.* Plant, *nat. size.* Plant and leaf, *magn.*
*P. subulatum.* Plant, *nat. size.* Plant and leaf, *magn.*
*P. axillare.* Plant, *nat. size.* Plant and leaf, *magn.*
*P. patens.* Plant, *nat. size.* Plant and leaf, *magn.*
*P. bryoides.* Plant, *nat. size.* Plant and leaf and capsule *magn.*
*P. curvicollum.* Plant, *nat. size.* Plant and leaf, *magn.*
*P. rectum.* Plant, *nat. size.* Plant and leaf and capsule, *magn*
*P. muticum.* Plants of var. *α*, *nat. size.* Plants, *magn.* Lea and point of a leaf, *magn.* Plants of *β*, *nat. size.* Lea and point of a leaf, *magn.*
*P. cuspidatum.* Plants, *nat. size.* Plants and leaves, *magn.*

## Tab. VI. Species.

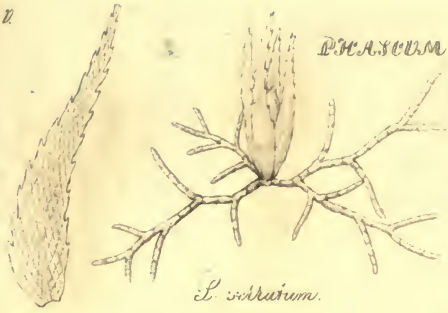
(Anictangium and part of Gymnostomum.)

*Anict. ciliatum.* Plant, *nat. size.* Cauline leaf (f. 1.), peri chætial leaf (f. 2.), Capsule and Operculum, *magn.*
*Anict. imberbe.* Plants, *nat. size.* Cauline leaf (f. 1.), peri chætial leaf (f. 2.), Capsule and Operculum, *magn.*
Gymnostomum *lapponicum.* Tuft, *nat. size.* Cauline lea (f. 1.), perichætial leaf (f. 2.), point of a leaf, Capsule Operculum, and Calyptra, *magn.*
*Gymn. viridissimum.* Tuft, *nat. size.* Leaf, point of leaf, Cap sule and Operculum, *magn.*
*Gymn. æstivum.* Tuft, *nat. size.* Cauline leaf (f. 1.), perichæ

S. latifolium
S. squarrosum
S. cuspidatum

Tab. V.

PHASCUM.



P. cuspidatum.

P. alsinifolium.

P. crispum.

P. subulatum.

P. axillare.

P. patens.

P. bryoides.

P. curvicollum.

W. Hooker Del.

P. mitricum.

Edwards Sculp.

P. cuspidatum.

P. rectum.

var. α.

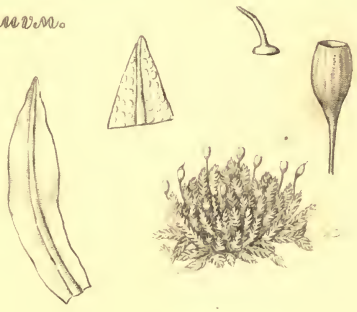
var. β.

A. ciliatum.

A. imberbe.

GYMNOSTOMUM.

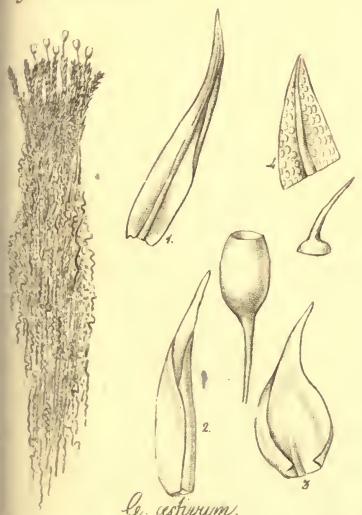
G. lapponicum.



G. curvirostrum.

W.J. Hooker, Esq. del.

Edwards Sc.

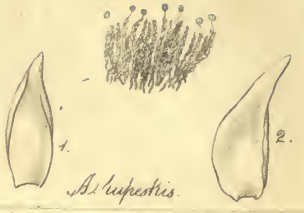


G. aestivum.

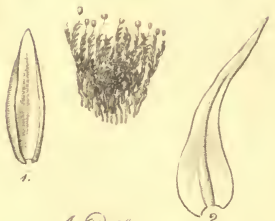
G. curvirostrum.

ANDRÆA.

A. alpina.




A. rupestris.




A. Rothii.

A. nivalis.

SCHISTOSTEGA.

S. pennata.

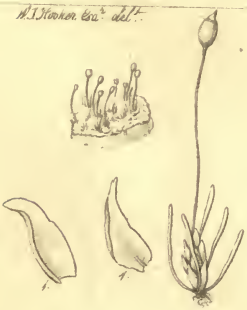
DIPHYSCIUM.

D. foliosum.

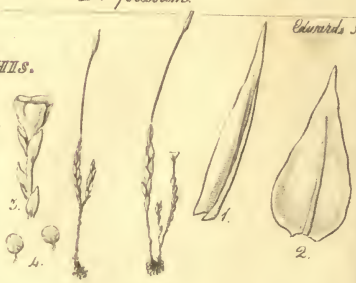
W. J. Hooker Esq.r del.t

Edwards Sculp.t

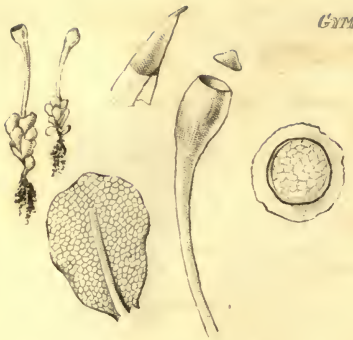
TETRAPHIS.



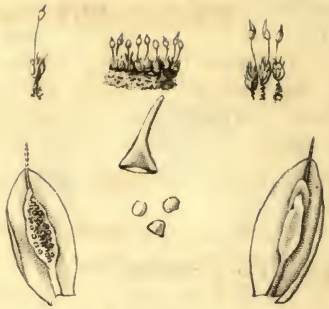

T. ovata.




T. pellucida.

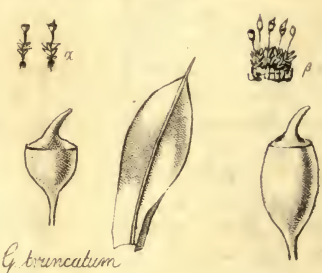


G. Griffithianum

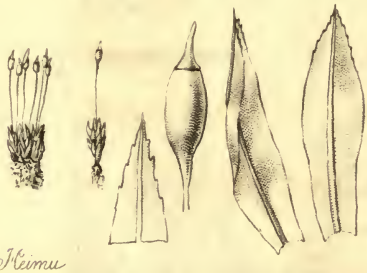


G. ovatum

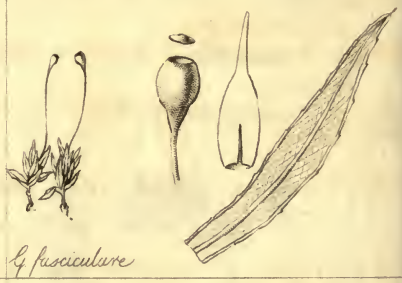
G. conicum




G. truncatum

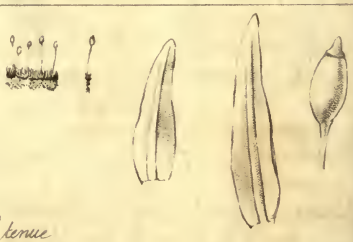


G. Heimii



G. fasciculare

G. pyriforme



G. tenue

G. Donnianum

G. microstem

tial leaves (f. 2, 3.), point of a leaf, Capsule, and Operculum, *magn.*

*Gymn. curvirostrum.* Tufts, *nat. size.* Leaf and Capsule, *magn.*

## Tab. VII. Species.

(Gymnostomum continued.)

*Gymn. Griffithianum.* Plants, *nat. size.* Leaf, Capsule, Operculum, Calyptra, and mouth of the Capsule, *magn.*

*Gymn. ovatum.* Tuft and single plants, *nat. size.* Leaves and granules and Operculum, *magn.*

*Gymn. conicum.* Tuft, *nat. size.* Leaves, Capsule, and Operculum, *magn.*

*Gymn. truncatulum.* Tufts and plants of $\alpha$ and $\beta$, *nat. size.* Leaf and Capsules of $\alpha$ and $\beta$, *magn.*

*Gymn. Heimii.* Tuft and single plant, *nat. size.* Leaves, and point of a leaf, and Capsule, *magn.*

*Gymn. fasciculare.* Plants, *nat. size.* Leaf, Capsule, Operculum, and Calyptra, *magn.*

*Gymn. pyriforme.* Plants, *nat. size.* Leaf, Capsule, and Operculum, *magn.*

*Gymn. tenue.* Tuft and single plant, *nat. size.* Leaves and Capsule, *magn.*

*Gymn. Donnianum.* Plants, *nat. size.* Leaves and Capsule, *magn.*

*Gymn. microstomum.* Tuft, *nat. size.* Leaf and Capsule, *magn.*

## Tab. VIII. Species.

(Andræa to Tetraphis.)

*Andr. alpina.* Tuft, *nat. size.* Perichætial leaf (f. 1.), and Cauline leaf (f. 2.), *magn.*

*Andr. rupestris.* Tuft, *nat. size.* Perichætial leaf (f. 1.), and Cauline leaf (f. 2.), *magn.*

*Andr. Rothii.* Tuft, *nat. size.* Perichætial leaf (f. 1.), Cauline leaf (f. 2.), *magn.*

Schistostega *pennata.* Plants, *nat. size.* Plants and leaves, *magn.*

Diphyscium *foliosum.* Tuft and single plants, *nat. size.* Plant, *magn.* Cauline leaf (f. 1.), and Perichætial leaf, *magn.*

Tetraphis *ovata.* Tuft, *nat. size.* Plant, *magn.* Perichætial leaves (f. 1.), and Cauline leaf (f. 2.), *magn.*

## Tab. IX. Species.

(Splachnum.)

*Spl. sphæricum.* Plants, *nat. size.* Leaves and Capsules, *magn.*

*Spl. tenue.* Plants, *nat. size.* Leaf and Capsules, *magn.*

*Spl. mnioides.* Tufts, *nat. size.* Leaves and Capsules, *magn.*

*Spl. ampullaceum.* Plants, *nat. size.* Leaf and Capsule, *magn.*

*Spl. angustatum.* Tuft, *nat. size.* Leaf and Capsule, *magn.*

*Spl. Frœlichianum.* Tuft, *nat. size.* Leaf, Capsule, and teeth of the Peristome, *magn.*

## Tab. X. Species.

(Conostomum and part of Polytrichum.)

*Conost. boreale.* Tuft, *nat. size.* Portion of a branch and leaf, *magn.*

Polytrichum *undulatum.* Plant, *nat. size.* Leaf, point of a leaf, and central portion of a leaf, showing the nerve, *magn.*

*Pol. hercynicum.* Plant, *nat. size.* Leaves, *magn.*

*Pol. piliferum.* Plants, *nat. size.* Leaf, and point of leaf, *magn.*

*Pol. juniperinum,* nat. size. Leaf, *magn.*

*Pol. septentrionale.* Tuft, *nat. size.* Leaf, and point of a leaf, *magn.*

*Pol. commune.* Plant, *nat. size.* Leaf, and point of leaf, *magn.*

## Tab. XI.. Species.

(Polytrichum continued, and Cinclidotus.)

*Pol. commune.* Plant, *nat. size.* Leaf and Capsules, *magn.*

*Pol. urnigerum.* Plant, *nat. size.* Leaf, *magn.*

*Pol. aloides.* Plants, *nat. size,* $\alpha$ and $\beta$. Leaf, and point of leaf, *magn.*

*Pol. nanum.* Plants, *nat. size.* Leaf, and point of leaf, *magn.*

Cinclidotus *fontinaloides.* Plant, *nat. size.* Leaf, Capsule, and perichætial leaf, *magn.*

S. sphaericum.
S. tenue.
S. ampullaceum.
S. mnioides.
S. angustatum.
S. Faluchianum.

CONOSTOMUM.

C. boreale.

POLYTRICHUM.

P. hercynicum

P. piliferum

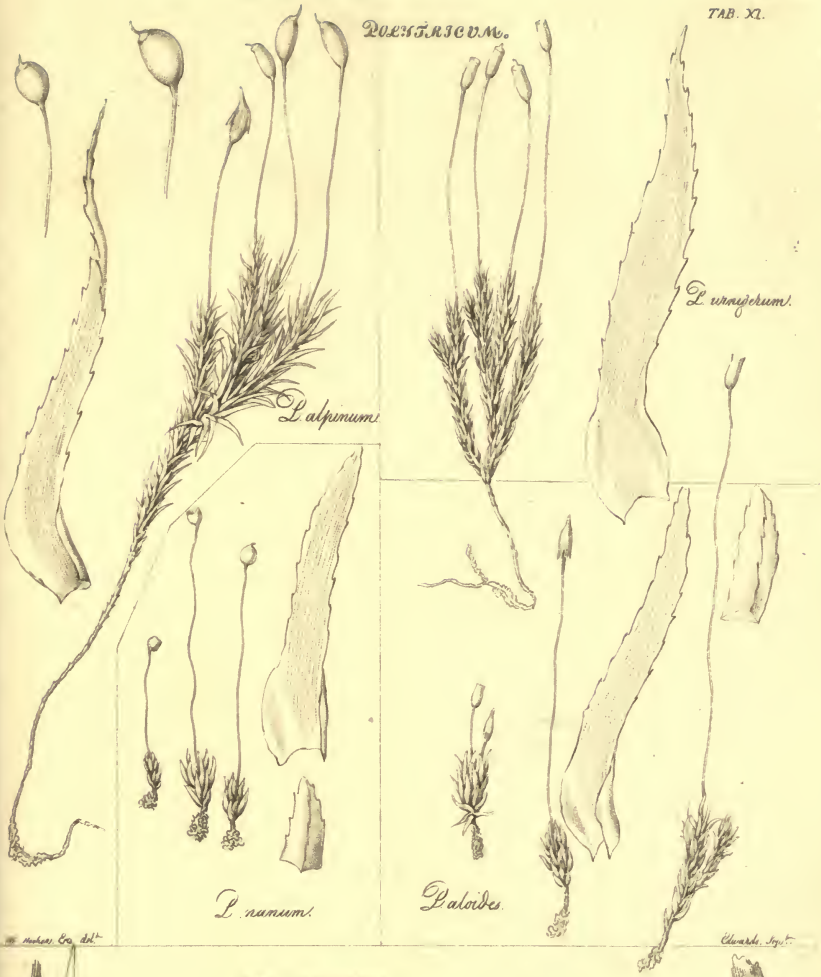
P. undulatum

P. septentrionale

P. commune.

Wokes. Sc. del.

# POLYTRICUM.




# CINCLIDOTUS.

E. streptocarpa.

E. vulgaris.

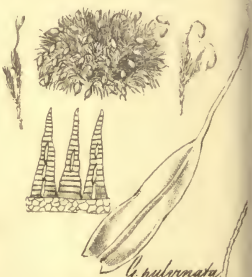
E. ciliata.

SYNOPSIS.

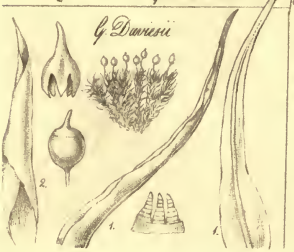
G. apocarpa.

G. maritima.

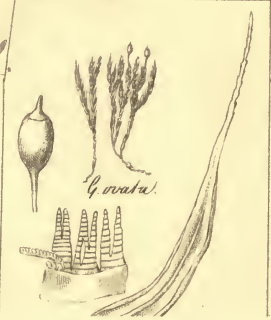
G. saxicola.



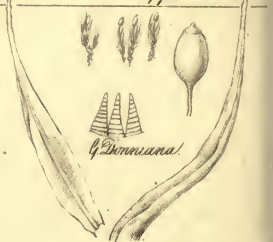
G. pulvinata.



G. Davesii.

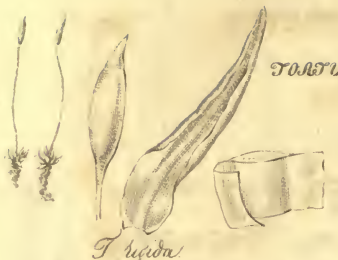


G. ovata.



G. Donniana.

TORTULA.


T. hyda

T. muralis

T. subulata

T. ruralis

T. cuneifolia

T. stellata

T. tortuosa

T. fallax

T. revoluta

T. unguiculata

T. convoluta

## Tab. XII. Species.

(Tortula.)

*T. rigida.* Plants, *nat. size.* Leaf, portion of leaf, and Capsule, *magn.*

*T. muralis.* Tuft and single plant, *nat. size.* Leaf and Capsule, *magn.*

*T. subulata.* Plants, *nat. size.* Leaf and Peristome, *magn.*

*T. ruralis.* Plant, *nat. size.* Leaves, Capsule, and Operculum, *magn.*

*T. tortuosa.* Plants, *nat. size*, and Leaf, *magn.*

*T. cuneifolia.* Plants, *nat. size.* Leaves, *magn.*

*T. stellata.* Plants, *nat. size.* Leaf, Capsule, and Operculum, *magn.*

*T. fallax.* Plants, *nat. size.* Leaf, Capsule, and Operculum, *magn.*

*T. revoluta.* Plant, *nat. size.* Portion of plant showing the Perichætium. Leaf (f. 1.), point of leaf (f. 2.), and perichætial leaf (f. 3.), *magn.*

*T. unguiculata.* Tufts, *nat. size.* Leaf, and point of leaf, *magn.*

*T. convoluta.* Plant, *nat. size.* Portion of plant, Leaf (f. 1.), and perichætial leaf (f. 2.), *magn.*

## Tab. XIII. Species.

(Encalypta and Grimmia.)

*Enc. streptocarpa.* Plant, *nat. size.* Leaf and Calyptra, *magn.*

*Enc. vulgaris.* Tuft, *nat. size.* Leaves, Capsule, and Calyptra, *magn.*

*Enc. ciliata.* Tufts, *nat. size.* Leaves, Capsule, and Calyptra, *magn.*

Grimmia *apocarpa.* Plants in various states, *nat. size.* Cauline leaves (f. 1. 1.), point of cauline leaves (f. 2.), perichætial leaves (f. 3. 3.), and point of perichætial leaves (f. 4.), *magn.*

*Gr. maritima.* Tuft, *nat. size.* Leaves and point of tuft (f. 1. 1. 1.), Perichætial leaves, and point of perichætial leaves, *magn.*

*Gr. saxicola.* Plants, *nat. size* (f. 1.). Plant (f. 2.), Leaf (f. 3, 4.), and Calyptra (f. 5.), *magn.*

*Gr. pulvinata.* Tuft, *nat. size,* and single plants. Leaf and teeth of the Peristome, *magn.*

*Gr. Daviesii.* Tuft, *nat. size.* Leaves (f. 1. 1.), Perichætial leaf (f. 2.), Capsule, Calyptra, and teeth of the Peristome, *magn.*

*Gr. Donniana.* Plants, *nat. size.* Leaves, Capsule, and teeth of the Peristome, *magn.*

## Tab. XIV. Species.

(Pterogonium, and part of Weissia.)

*Pt. Smithii.* Plant, *nat. size.* Leaves (f. 1. 1.), Perichætium and Capsule (f. 2.), and Perichætial leaf (f. 3.), *magn.*

*Pt. gracile.* Plant, *nat. size.* Leaves (f. 1. 1.), Perichætial leaf (f. 2. 2.), and Capsule (f. 3.), *magn.*

*Pt. filiforme.* Plant, *nat. size.* Leaf, and apex of a leaf, and Capsule, *magn.*

Weissia *splachnoides.* Plants, *nat. size.* Leaf, Capsule, and teeth of the Peristome, *magn.*

*W. Templetoni.* Plants, *nat. size.* Leaves and Capsule, *magn.*

*W. nuda.* Plants, *nat. size.* Leaves, Capsules, portion of the mouth of the Capsule, and tooth of the Peristome, *magn.*

*W. nigrita.* Tuft and single plant, *nat. size.* Leaves and Capsule, *magn.*

*W. Starkeana.* Tuft, *nat. size.* Single plant, Leaves, Capsule, teeth of the Peristome, and Opercula, *magn.*

*W. affinis.* Plants, *nat. size.* Single plant, Leaves, mouth of the Capsule, and teeth of the Peristome, *magn.*

*W. lanceolata.* Plants, *nat. size.* Single plant, Leaf, and teeth of the Peristome, *magn.*

*W. curvirostra.* Tuft, *nat. size.* Leaf, Capsule, mouth of the Capsule, and teeth of the Peristome, *magn.*

## Tab. XV. Species.

(Weissia continued.)

*W. striata.* Tufts, *nat. size.* Leaves, points of Leaves, and Capsule, *magn.*

*W. trichodes.* Plants, *nat. size.* Single plant, Leaves, Capsule, mouth of the Capsule, Operculum, and Calyptra, *magn.*

PTEROSONIUM.

Pt. Smithii.

Pt. gracile.

Pt. plicatum.

WEISSIA.

W. Splachnoides.

WEISSIA.

W. Templetonii.

W. nuda.

W. nigrita.

W. Starkeana.

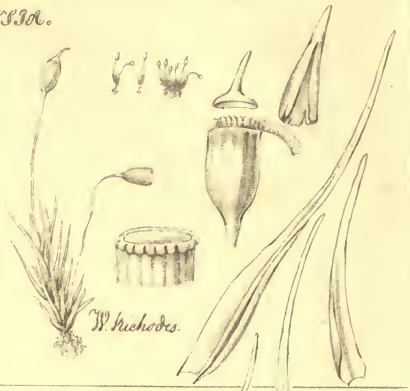
W. affinis.

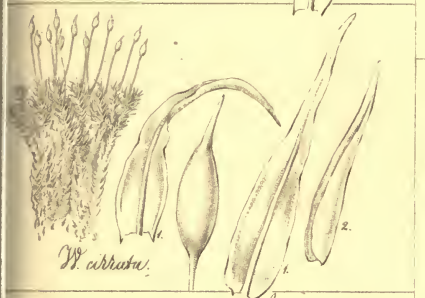
W. lanceolata.

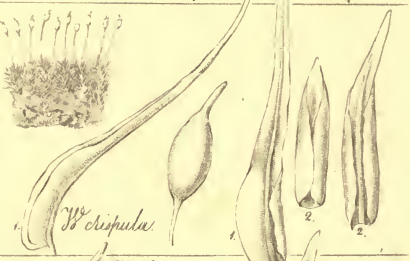
W. curvirostra.

Tab. XV.

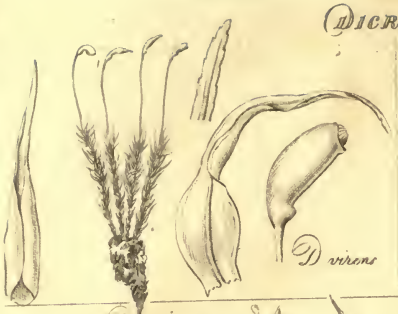
WEISSIA.



# DICRANUM.


D. virens

D. strumiferum

D. varium

D. falcatum

D. Starkii

D. flavescens

D. pellucidum

D. squarrosum

D. spurium

D. crispum

Edwards Sculpt.

D. Bryoides.

D. adiantoides.

D. fuciformium.

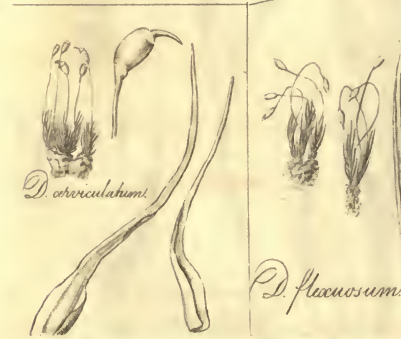
D. glaucum.

D. longifolium.

D. latifolium.

Hooker & Taylor del.

Edwards Scp.



D. convolutum.

D. flexuosum.

*W. cirrata.* Tuft, *nat. size.* Leaves (f. 1. 1.), Perichætial leaf (f. 2.), and Capsule, *magn.*

*W. crispula.* Tuft, *nat. size.* Leaves (f. 1. 1.), Perichætial leaves (f. 2. 2.), and Capsule, *magn.*

*W. controversa.* Tuft and single plant, *nat. size.* Leaf, point of a Leaf, Capsule, and teeth of the Peristome, *magn.*

*W. calcarea.* Plants, *nat. size.* Single plant, Leaves, and Calyptra, *magn.*

*W. pusilla.* Plants, *nat. size.* Single plant, Leaf and teeth of the Peristome, *magn.*

*W. recurvata.* Plants, *nat. size.* Single plant, Leaf and teeth of the Peristome, *magn.*

*W. verticillata.* Tuft and single Plant, *nat. size.* Leaf and Capsule, *magn.*

*W. acuta.* Tuft and single Plant, *nat. size.* Leaf (f. 1.); Perichætial leaf (f. 2.), and Capsules, *magn.*

## Tab. XVI. Species.

(Part of Dicranum.)

*D. bryoides.* (f. 1, 2.) Plants, *nat. size* and *magn.* of var. α. (f. 3.) Plants of var. β, (f. 4.) Superior leaf, (f. 5.) Inferior leaf, (f. 6.) Apex of a leaf, *magn.*

*D. adiantoides.* Plant, *nat. size* (f. 1.). Perichætium (f. 2.), Leaf (f. 3.), *magn.*

*D. taxifolium.* Plant, *nat. size* (f. 1.), Plant (f. 2.), Leaf (f. 3), Perichætial leaf (f. 4.), *magn.*

*D. glaucum.* Sterile and fertile plants, *nat. size.* Leaf, and portion of a leaf, *magn.*

*D. latifolium.* Plant, *nat. size.* Capsule, Leaves, and Peristome, *magn.*

*D. longifolium.* Plant, *nat. size.* Capsule, Leaf, and portion of leaf, showing the broad nerve, *magn.*

*D. cerviculatum.* Tuft, *nat. size.* Leaves and Capsule, *magn.*

*D. flexuosum.* Plants, *nat. size* (f. 1, 2, 3.). Leaves, Capsule, and Calyptra, *magn.*

## Tab. XVII. Species.

(Dicranum continued.)

*D. virens.* Tuft, *nat. size.* Leaf, Apex of leaf, and Perichætial leaf, *magn.*

*D. strumiferum.* Tuft, *nat. size.* Leaf and Capsule, *magn.*

*D. varium.* Tufts of $\alpha$, $\beta$, and $\gamma$, *nat. size.* Capsules of *D. varium.* Leaves of *D. varium*, *magn.*
*D. falcatum.* Tufts, *nat. size.* Leaf and Capsules, *magn.*
*D. Starkii.* Tuft, *nat. size.* Capsule and Leaf, *magn.*
*D. flexuosum.* Tuft, *nat. size.* Leaf, Apex of leaf, and Capsule, *magn.*
*D. pellucidum.* Tuft, *nat. size.* Capsule and Leaf, *magn.*
*D. squarrosum.* Tufts, *nat. size.* Leaves and Capsule, *magn.*
*D. spurium.* Plant, *nat. size.* Leaves, and portion of a leaf, *magn.*
*D. crispum.* Tuft and single Plant. Leaves and Capsule, *magn.*

## Tab. XVIII. Species.

(Dicranum continued.)

*D. Scottianum.* Tuft, *nat. size.* Leaf (f. 1.), Perichætial leaf (f. 2.), and Capsule, *magn.*
*D. polycarpum.* Tuft, *nat. size.* Leaf (f. 1.), Perichætial leaf (f. 2.), and Capsule, *magn.*
*D. scoparium.* Plants, *nat. size*, $\alpha$ and $\beta$. Leaves (f. 1, 2.), Perichætial leaf (f. 3.), *magn.*
*D. undulatum.* Plants, *nat. size.* Leaf (f. 1.), Perichætial leaf (f. 2.), *magn.*
*D. heteromallum.* Tuft, *nat. size.* Leaf (f. 1.), Apex of leaf (f. 2.), and Capsule, *magn.*
*D. subulatum.* Tuft, *nat. size.* Leaves (f. 1. 1.), Apex of leaf, and Capsule, *magn.*

## Tab. XIX. Species.

(Trichostomum.)

*Tr. patens.* Plant, *nat. size.* Leaf, Capsule, and Operculum, *magn.*
*Tr. lanuginosum.* Plant, *nat. size.* Leaf and Capsule, *magn.*
*Tr. canescens.* Plants, *nat. size.* Leaf, Capsule, and Teeth, *magn.*
*Tr. heterostichum.* Tuft, *nat. size.* Leaf, Capsule, and teeth of the Peristome, *magn.*
*Tr. microcarpon.* Tuft, *nat. size.* Leaf, Capsules, and teeth of the Peristome, *magn.*
*Tr. aciculare.* Plant, *nat. size.* Leaf and Capsule, *magn.*
*Tr. fasciculare.* Plant, *nat. size.* Leaf and Capsule, *magn.*

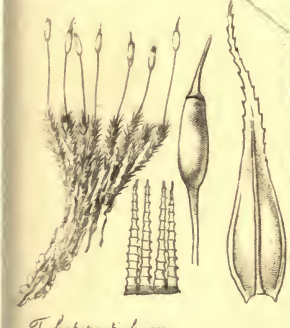
# DICRANUM.

D. Scottianum.
D. polycarpum.
D. scoparium.
D. undulatum.
D. heteromallum.
D. subulatum.
Edwards Sculpt.

T. pulvinatum

T. lanuginosum

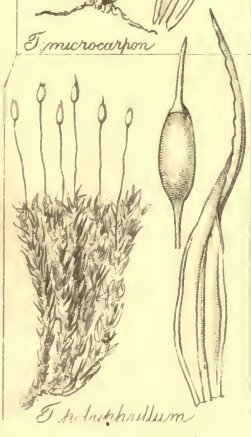
T. canescens

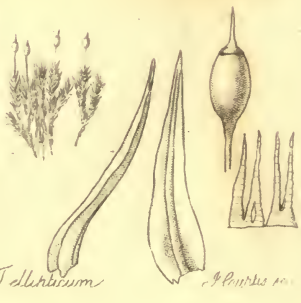

T. heterostichum

T. mucrocarpon

T. acuculare

T. fascaculare

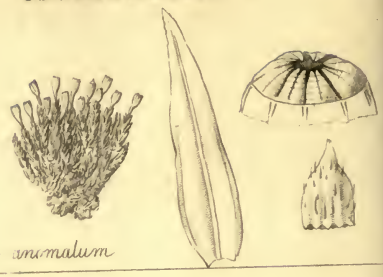

T. subulatifolium


T. elatum

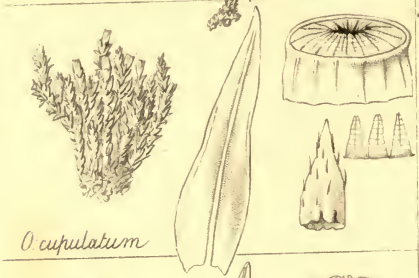
ZYGODON.

ORTHOTRICUM.

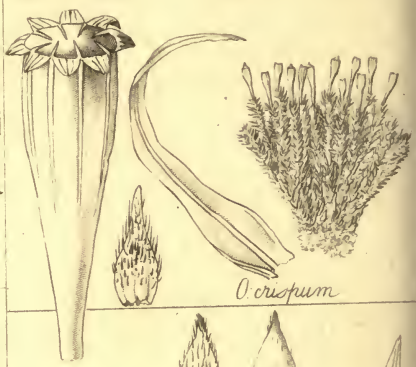
Z conoideum



O anomalum



O cupulatum



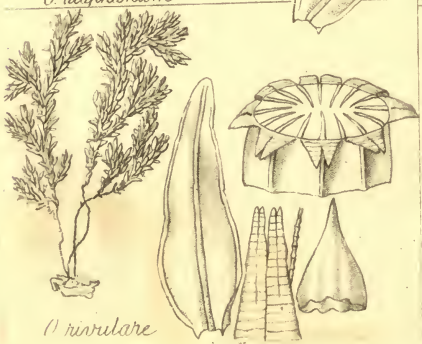
O crispum

O Hutchinsiæ

O affine

O diaphanum

O pulchellum



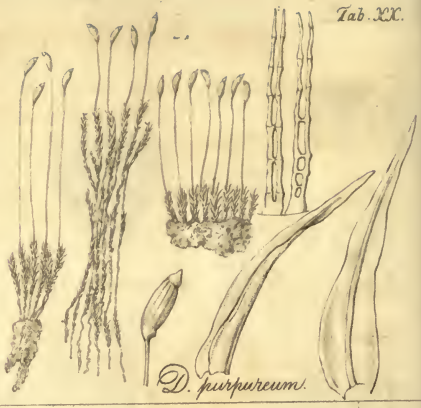
O rivulare

O striatum

Tab. XX.

## LEUCODON.

L. sciuroides.



D. purpureum.

## DIDYMODON.

D. inclinatum.

D. nervosum.

D. flexifolium.

D. fissidulum.

D. trifarium.

D. capillaceum.

Edwards Sculpt.

## FUNARIA.

D. heteromallum.

F. hygrometrica.

F. muhlenbergii.

F. hybernica.

*Tr. polyphyllum.* Tuft, *nat. size.* Leaf and Capsule, *magn.*
*Tr. ellipticum.* Tuft, *nat. size.* Leaves, Capsule, and teeth of the Peristome, *magn.*

## Tab. XX. Species.

(Leucodon to Funaria.)

*Leuc. sciuroides.* Plant, *nat. size.* Leaf (f. 1.), Outer perichætial leaf (f. 2.), Inner perichætial leaf (f. 3.), *magn.*
Didymodon *purpureum.* Tufts, *nat. size.* Leaves, Capsule, and teeth of the Peristome, *magn.*
*Did. inclinatum.* Tuft, *nat. size.* Leaf and Capsule, *magn.*
*Did. nervosum.* Tuft, *nat. size.* Single plant, Leaf, Capsule, Operculum, and teeth of the Peristome, *magn.*
*Did. flexifolium.* Tufts and single plants, *nat. size.* Leaf of the Stem (f. 1.), and Leaf of the Perichætium (f. 2.), *magn.*
*Did. rigidulum.* Tuft and single plant, *nat. size.* Leaves, Capsule, and teeth of the Peristome, *magn.*
*Did. trifarium.* Tufts (f. 1, 2.), *nat. size.* Leaves (f. 3, 4.), Capsule, and teeth of the Peristome, *magn.*
*Did. capillaceum.* Tufts, *nat. size.* Leaf and Capsule, *magn.*
*Did. heteromallum.* Tuft and single plants, *nat. size.* Leaves, Capsule, Operculum, and teeth of the Peristome, *magn.*
Funaria *hygrometrica.* Plants, *nat. size.* Leaf, *magn.*
*Fun. Muhlenbergii.* Plants, *nat. size.* Leaf, *magn.*
*Fun. hibernica.* Plants, *nat. size.* Leaf, *magn.*

## Tab. XXI. Species.

(Zygodon, and part of Orthotrichum.)

*Zygodon conoideum.* Tuft, *nat. size.* Plant and Leaf, *magn.*
Orthotrichum *anomalum.* Tuft, *nat. size.* Leaf, mouth of the Capsule, and Calyptra, *magn.*
*Orth. cupulatum.* Tuft, *nat. size.* Leaf, mouth of the Capsule, teeth of the Peristome, and Calyptra, *magn.*
*Orth. crispum.* Tuft, *nat. size.* Leaf, Capsule, and Calyptra, *magn.*
*Orth. Hutchinsiæ.* Tuft, *nat. size.* Leaf, Capsule, and Calyptra, *magn.*
*Orth. affine.* Tuft, *nat. size,* $\alpha$ and $\beta$. Leaf, mouth of the Capsule, and Calyptra, *magn.*
*Orth. diaphanum.* Tufts, *nat. size.* Leaf, mouth of the Capsule, and Calyptra, *magn.*

*Orth. pulchellum.* Tuft, *nat. size.* Leaf, mouth of the Capsule, and Calyptra, *magn.*

*Orth. rivulare.* Plant, *nat. size.* Mouth of the Capsule, Leaf, tooth of the Peristome, and Calyptra, *magn.*

*Orth. striatum.* Plants, *nat. size.* Leaf, Capsule, mouth of the Capsule, teeth of the Peristome, and Operculum, *magn.*

## Tab. XXII. Species.

(Orthotrichum to Buxbaumia.)

*Orth. Lyellii.* Plant, *nat. size.* Leaf, Capsules, with the Peristome erect and reflexed, mouth of the Capsule, and teeth of the Peristome, *magn.*

Neckera *pumila.* Leaf (f. 1.), Perichætial leaves (f. 2, 3.), Capsule, and Perichætium, all *magn.*

*N. crispa.* Leaf, Capsule, and Perichætium, all *magn.*

Anomodon *curtipendulum.* Leaf (f. 1.), Perichætial leaf (f. 2.), Capsule, and Perichætium, all *magn.*

*An. viticulosum.* Leaf (f. 1.), Apex of a leaf (f. 2.), Perichætial leaf (f. 3.), Capsule, and Perichætium, all *magn.*

Daltonia *splachnoides.* Plants, *nat. size* (f. 1.) Single plant (f. 2.), Leaf (f. 3.), Perichætial leaf (f. 4.), Capsule, and Perichætium (f. 5.), portion of the Capsule with the Peristome (f. 6.), base of the Calyptra (f. 7.), and Calyptra (f. 8.), *magn.*

*Dalt. heteromalla.* Leaf (f. 1.), Perichætial leaf (f. 3.), Capsule and Perichætium, *magn.*

Fontinalis *antipyretica.* Portions of the stem, *nat. size* Leaf (f. 1.), Perichætial leaf (f. 2.), *magn.*

*Font. squamosa.* Portions of the stem, *nat. size.* Leaves (f. 1.), Perichætial leaf (f. 2.), *magn.*

*Font. capillacea.* Portion of the stem, *nat. size.* Leaves, *magn.*

## Tab. XXIII. Species.

(Bartramia.)

Bart. *pomiformis.* Plants *α*, *β*, *nat. size.* Leaf, *magn.*

*Bart. ithyphylla.* Plant, *nat. size.* Leaf, *magn.*

*Bart. gracilis.* Tuft, *nat. size.* Leaf, *magn.*

*Bart. fontana.* Plants *α* and *β*, *nat. size.* Leaves of *α* and *β*, *magn.*

*Bart. Halleriana.* Tuft and single plant, *nat. size.* Leaf, *magn.*

*Bart. arcuata.* Plant, *nat. size.* Leaf, *magn.*

ORTHOTRICHUM.

O. Lyellii

NECKERA. Tab XXII.

N. pumila.

N. crispa.

A. curtipendulum.

ANOMODON.

A. viticulosum.

D. splachnoides.

DALTONIA.

D. hedwigioides.

F. taxifolia.

FONTINALIS.

F. capillacea.

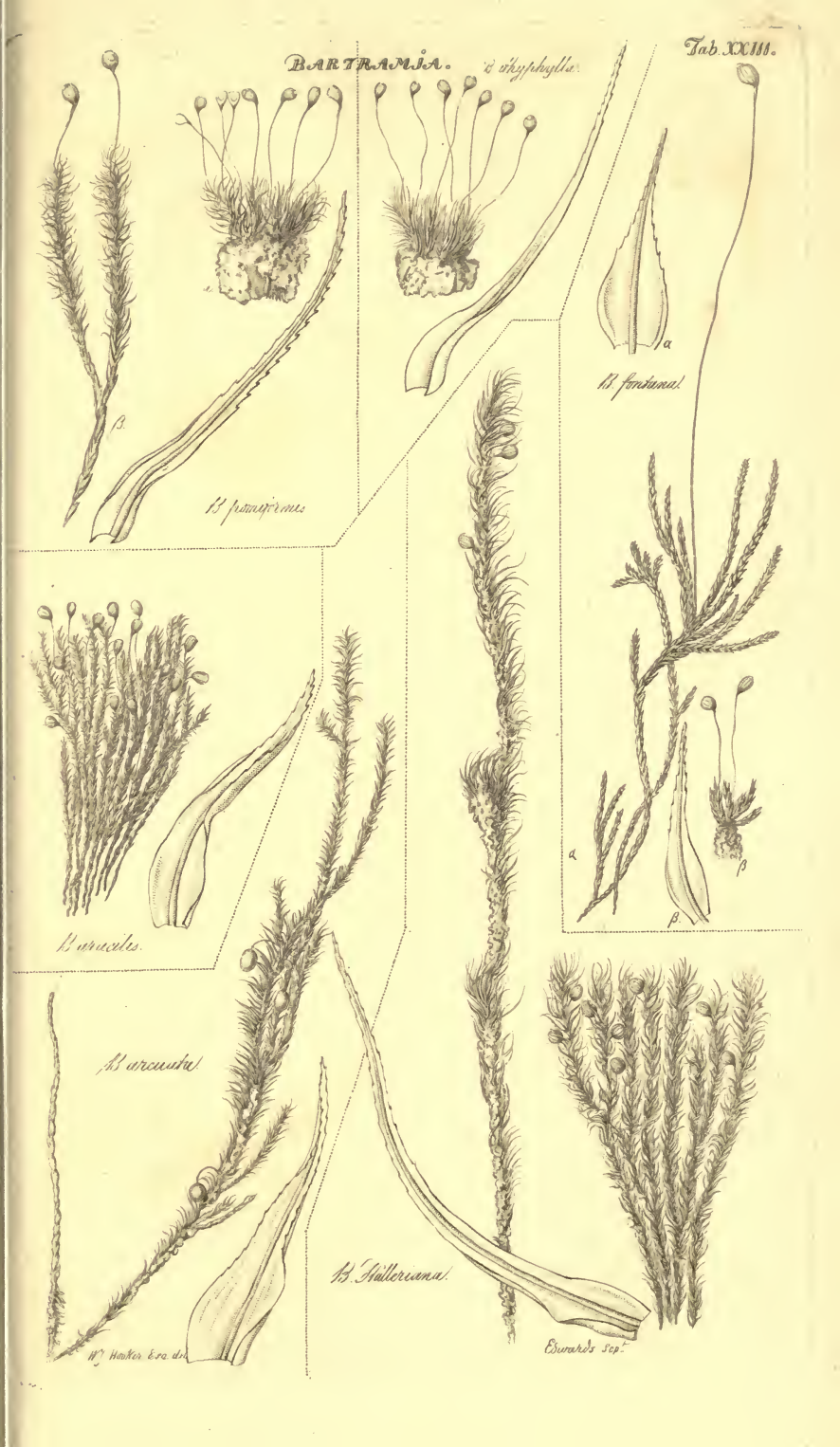
Hooker Esq.r del.t Edwards Sc.t

BUXBAUMIA.

B. aphylla.

F. squamosa.

# BARTRAMIA.


B. ithyphylla.
B. pomiformis
B. fontana.
a
β
B. arcuata.
B. arcuata
B. Hallerana.
Wm Hooker Eqa del.
Edwards Sculp.

H. plumosum.

H. pulchellum.

H. crispescens.

H. sericeum.

H. lutescens.

H. nitens.

H. albicans.

H. alopecurum.

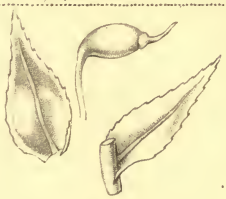
H. dendroides.

H. curvatum.

H. myosuroides.

H. splendens.

H. proliferum.

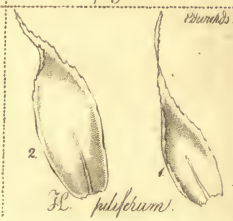


H. prolongum.

H. flagellare.

H. abietinum.

H. Blandowii.





H. pulferum.

H. trichomanoides.

H. complanatum.

H. riparium.

H. undulatum.

H. denticulatum.

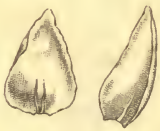
H. medium.

H. tenellum.

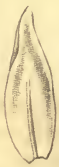
H. serpens.

H. populeum.

H. reflexum.



H. molle.



H. stramineum.

H. moniliforme.

H. Schreberi.

H. castenulatum.

H. murale.

H. purum.

H. flustrans

Edwards, sculp.

## Tab. XXIV. Species.

(Hypnum.)

*H. trichomanoides.* Leaf, *magn.*
*H. complanatum.* Leaves, *magn.*
*H. riparium.* Leaf, *magn.*
*H. undulatum.* Leaves and Capsule, *magn.*
*H. denticulatum.* Leaves and Capsule, *magn.*
*H. medium.* Leaf, *magn.*
*H. tenellum.* Leaves, *magn.*
*H. serpens.* Leaves, *magn.*
*H. populeum.* Leaves, *magn.*
*H. reflexum.* Leaves, *magn.*
*H. molle.* Leaves, *magn.*
*H. stramineum.* Leaf, *magn.*
*H. moniliforme.* Plant, *nat. size.* Leaf (f. 1.), Perichætial leaf (f. 2), and Capsule, *magn.*
*H. Schreberi.* Leaf, *magn.*
*H. catenulatum.* Plant, *nat. size.* Leaf and Capsule, *magn.*
*H. murale.* Leaf and Capsule, *magn.*
*H. purum.* Leaf and Capsule, *magn.*
*H. fluitans.* Leaf, *magn.*

## Tab. XXV. Species.

(Hypnum continued.)

*H. plumosum.* Leaf, *magn.*
*H. pulchellum.* Leaf, *magn.*
*H. rufescens.* Leaf, *magn.*
*H. sericeum.* Leaf, *magn.*
*H. lutescens.* Leaf and Capsule, *magn.*
*H. nitens.* Leaf and Capsule, *magn.*
*H. albicans.* Leaf, *magn.*
*H. alopecurum.* Leaf and Capsule, *magn.*
*H. dendroides.* Leaf and Capsule, *magn.*
*H. curvatum.* Leaves, *magn.*
*H. myosuroides.* Leaves, *magn.*
*H. splendens.* Leaf of a young shoot (f. 1.), Leaf of main branch (f. 2.), Leaf of main stem (f. 3.), *magn.*
*H. proliferum.* Leaf of a young shoot (f. 1.), Leaf of main branch (f. 2.), Leaf of main stem (f. 3.), *magn.*
*H. prælongum.* Leaves and Capsule, *magn.*

*H. flagellare.* Leaf of a branch (f. 1.), Leaf of main stem (f. 2.), *magn.*
*H. abietinum.* Leaf of a branch (f. 1.), Leaf of main stem (f. 2.), *magn.*
*H. Blandovii.* Leaf of main stem (f. 1.), Leaf of a branch (f. 2.), *magn.*
*H. piliferum.* Leaf of a branch (f. 1.), Leaf of main stem (f. 2 ), *magn.*

## Tab. XXVI. Species.

(Hypnum continued.)

*H. rutabulum.* Leaf and Capsule, *magn.*
*H. velutinum.* Leaves and Capsule, *magn.*
*H. ruscifolium.* Leaf, *magn.*
*H. striatum.* Leaf and Capsule, *magn.*
*H. confertum.* Leaf and Capsule, *magn.*
*H. cuspidatum.* Leaf, *magn.*
*H. cordifolium.* Leaf, *magn.*
*H. polymorphum.* Leaf, *magn.*
*H. stellatum.* Leaves, $\alpha$ and $\beta$, *magn.*
*H. loreum.* Leaf, *magn.*
*H. triquetrum.* Leaf, *magn.*
*H. squarrosum.* Leaf, *magn.*
*H. filicinum.* Leaves, *magn.*
*H. atro-virens.* Leaves, *magn.*
*H. uncinatum.* Leaves, *magn.*
*H. palustre.* Leaves, *magn.*
*H. aduncum.* Leaves, *magn.*
*H. rugulosum.* Leaf, *magn.*

## Tab. XXVII. Species.

(Hypnum concluded, and Hookeria.)

*H. commutatum.* (f. 1.) Leaf from a smaller branch. (f. 2.) Leaf from a main branch. (f. 3.) Leaf from the main stem, *magn.*
*H. scorpioides.* Leaves, *magn.*
*H. Silesianum.* Leaves and Capsule, *magn.*
*H. cupressiforme.* (f. 1.) Leaves of $\alpha$. (f. 2.) Leaves of $\gamma$. (f. 3.) Capsule, *magn.*
*H. Crista-castrensis.* (f. 1.) Leaf from a smaller branch. (f. 2.)

H. pustulatum.

H. velutinum.

H. Ruscifolium.

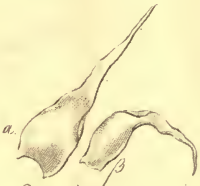
H. striatum.

H. confertum.

H. cuspidatum.

H. cordifolium.

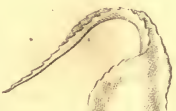
H. polymorphum.

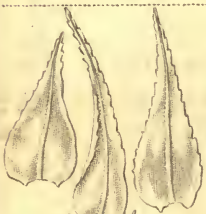


H. stellatum.

H. loreum.

H. triquetrum.


H. squarrosum.


H. filicinum.

H. atrovirens.

H. uncinatum.

Wincheb. Lith.

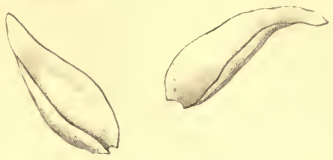
Schmidt's Lith.

H. palustre.

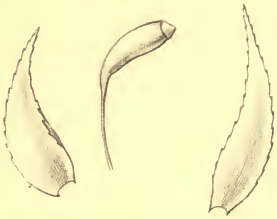
H. rudimentum.

H. rufulosum.

H. commutatum.



H. scorpioides.



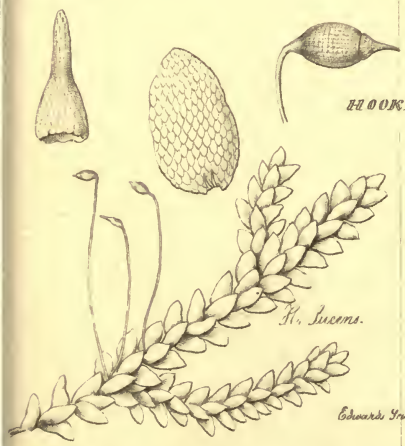
H. silesianum.

H. cupressiforme.

H. Crista-castrensis.

H. molluscum.

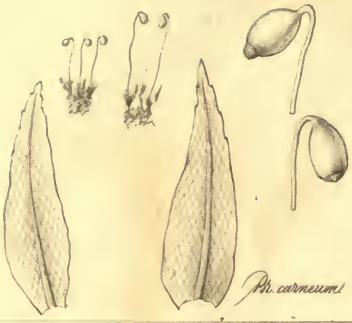
HOOKERIA.

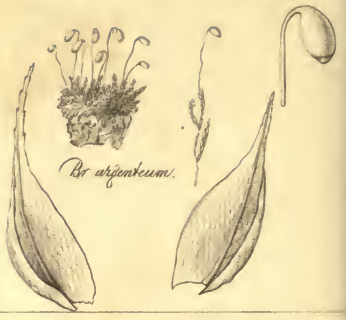


H. lucens.

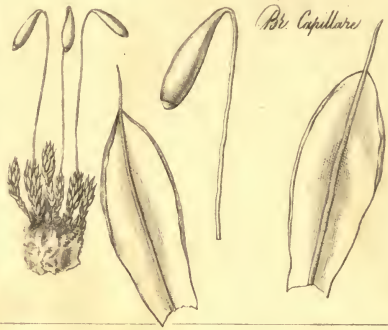
H. lete-virens.

Edwards Sculpsit

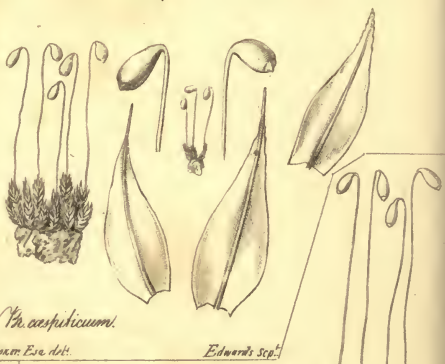

Br. carneum.


Br. argenteum.

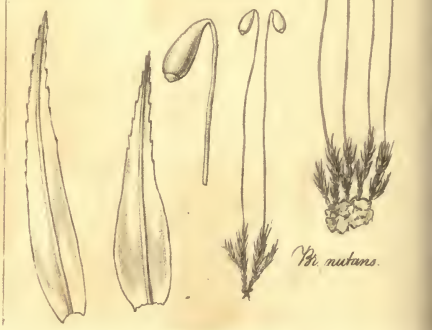
Br. Lehii


Br. Capillare

Br. Roseum.

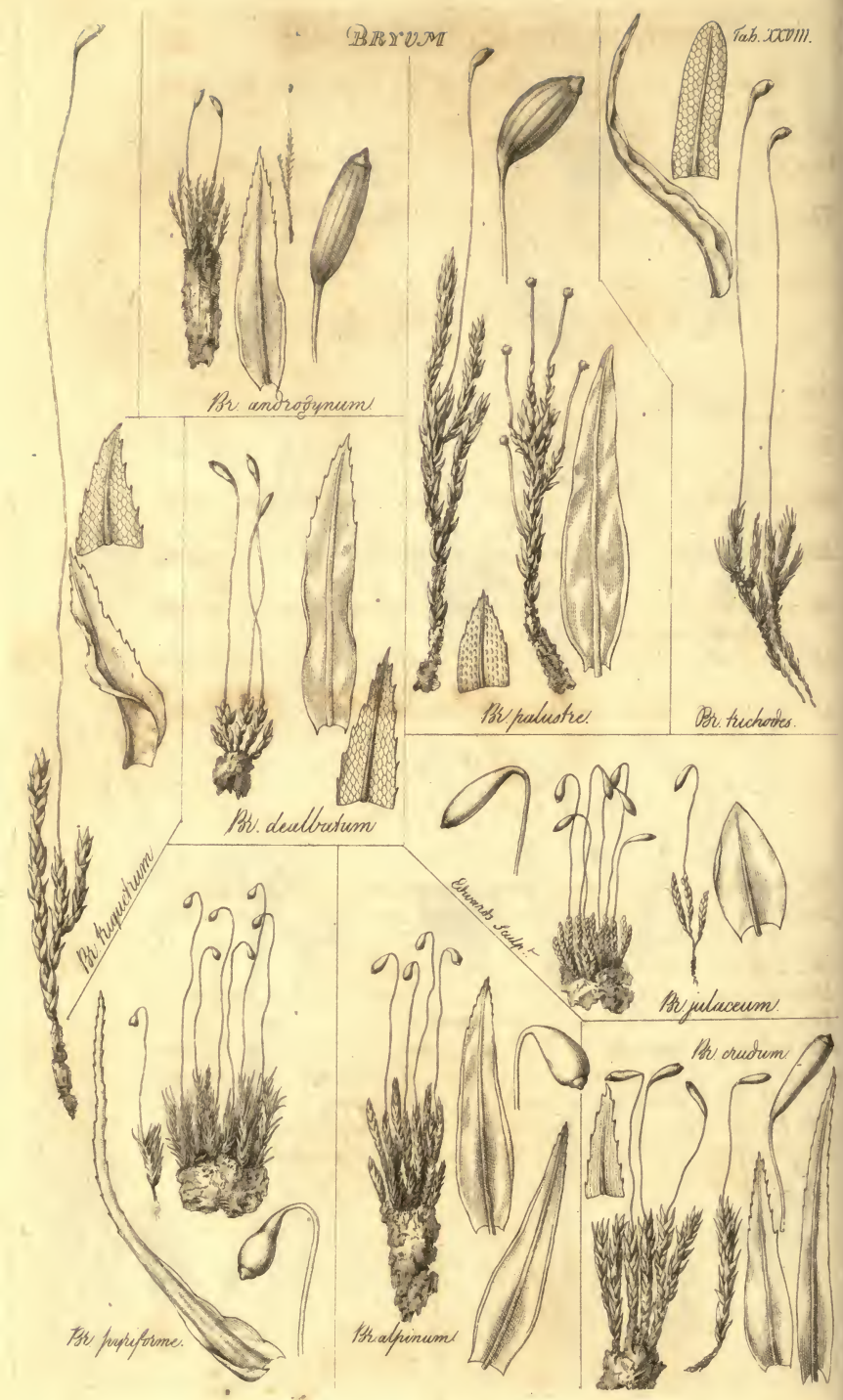

Br. caespiticium.
Hookr. Exe. del.
Edwards Sc.t

Br. turbinatum.


Br. nutans.

BRYUM

Tab. XXVIII.



Leaf from the main branch. (f. 3.) Leaf from the main stem, *magn.*

*H. molluscum.* Leaves, *magn.*

HOOKERIA *lucens.* Plant, *nat. size.* Leaf, Capsule, and Calyptra, *magn.*

*Hook. læte-virens.* Plant, *nat. size.* Leaves, Point of a leaf, Capsule and Calyptra, *magn.*

## TAB. XXVIII. SPECIES.

(BRYUM.)

BR. *androgynum.* Tufts, *nat. size.* Leaf and Capsule, *magn.*

*Br. palustre.* Plants, *nat. size.* Leaf and Capsule, *magn.*

*Br. trichodes.* Plants, *nat. size.* Leaf, and Point of a leaf, *magn.*

*Br. dealbatum.* Tuft, *nat. size.* Leaf, and Point of a leaf, *magn.*

*Br. triquetrum.* Plant, *nat. size.* Leaf, and Point of a leaf, *magn.*

*Br. pyriforme.* Tuft and single specimen, *nat. size.* Leaf and Capsule, *magn.*

*Br. julaceum.* Tuft and single plant, *nat. size.* Leaf and Capsule, *magn.*

*Br. alpinum.* Tuft and single plant, *nat. size.* Leaves, and Point of a leaf, *magn.*

## TAB. XXIX. SPECIES.

(BRYUM continued.)

*Br. carneum.* Tufts, *nat. size.* Leaves and Capsule, *magn.*

*Br. argenteum.* Tuft and single plant, *nat. size.* Leaves and Capsule, *magn.*

*Br. Zierii.* Plant, *nat. size.* Leaf, *magn.*

*Br. capillare.* Tuft, *nat. size.* Leaves and Capsule, *magn.*

*Br. roseum.* Plant, *nat. size.* Leaf, *magn.*

*Br. cæspiticium.* (f. 1.) Tuft, *nat. size.* (f. 2.) Tuft of $\beta$, *nat. size.* (f. 3.) Leaves of $\alpha$, *magn.* (f. 4.) Leaf of $\beta$, *magn.* (f. 5.) Capsule of $\alpha$, *magn.* (f. 6.) Capsule of $\beta$, *magn.*

*Br. turbinatum.* Plant, *nat. size.* Leaves and Capsules, *magn.*

*Br. nutans.* Tuft of plant, *nat. size.* Leaves and Capsules, *magn.*

## Tab. XXX. Species.

(Bryum continued.)

*Br. elongatum.* Plants, *nat. size.* (f. 1.) Cauline leaf. (f. 2.) Perichætial leaf. (f. 3.) Capsule, *magn.*

*Br. ventricosum.* Plant, *nat. size.* (f. 1 and 2.) Leaves and Capsule, *magn.*

*Br. rostratum.* Plants, *nat. size.* Leaf, portion of leaf, and Capsule, *magn.*

*Br. ligulatum.* Plants, *nat. size.* Leaf, portion of leaf, and Capsule, *magn.*

## Tab. XXXI. Species.

(Bryum continued, and Supplement.)

*Br. hornum.* Tuft, *nat size.* (f. 1.) Leaf. (f. 2.) Perichætial leaf, and portion of leaf, Capsule, and Lid, *magn.*

*Br. marginatum,* Plant, *nat. size.* (f. 1.) Leaf, (f. 2.) Cauline leaf, portion of leaf, and Capsule, *magn.*

*Br. cuspidatum.* Plants, *nat. size.* (f. 1.) Leaf, (f. 2.) perichætial Leaf, portion of leaf, Capsule, and Lid, *magn.*

(Splachnum, Supplement 1.)

*Splach. vasculosum.* Tuft, *nat. size.* Leaf and Capsule, *magn.*

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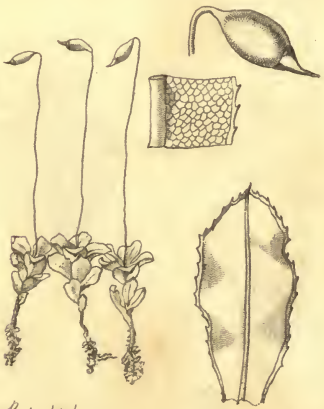
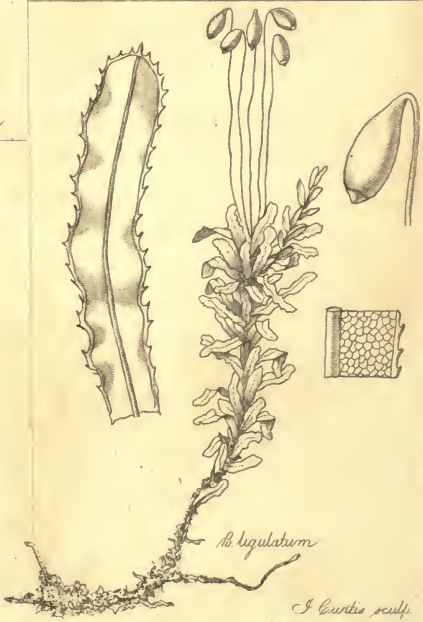
B. elongatum

B. ventricosum

B. punctatum



B. rostratum

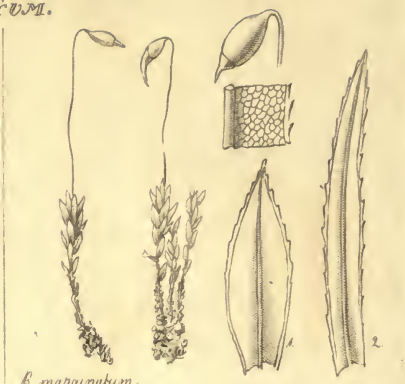


B. ligulatum

J. Curtis sculp.

# BRYUM.

B. hornum

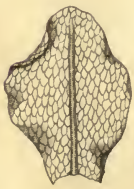


B. marginatum

B. cuspidatum

## Splachnum

SUPP I



Sphaericum

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